INDUSTRIAL ARITHMETIC
for
VOCATIONAL SCHOOLS
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GARDNER and MURTLAND
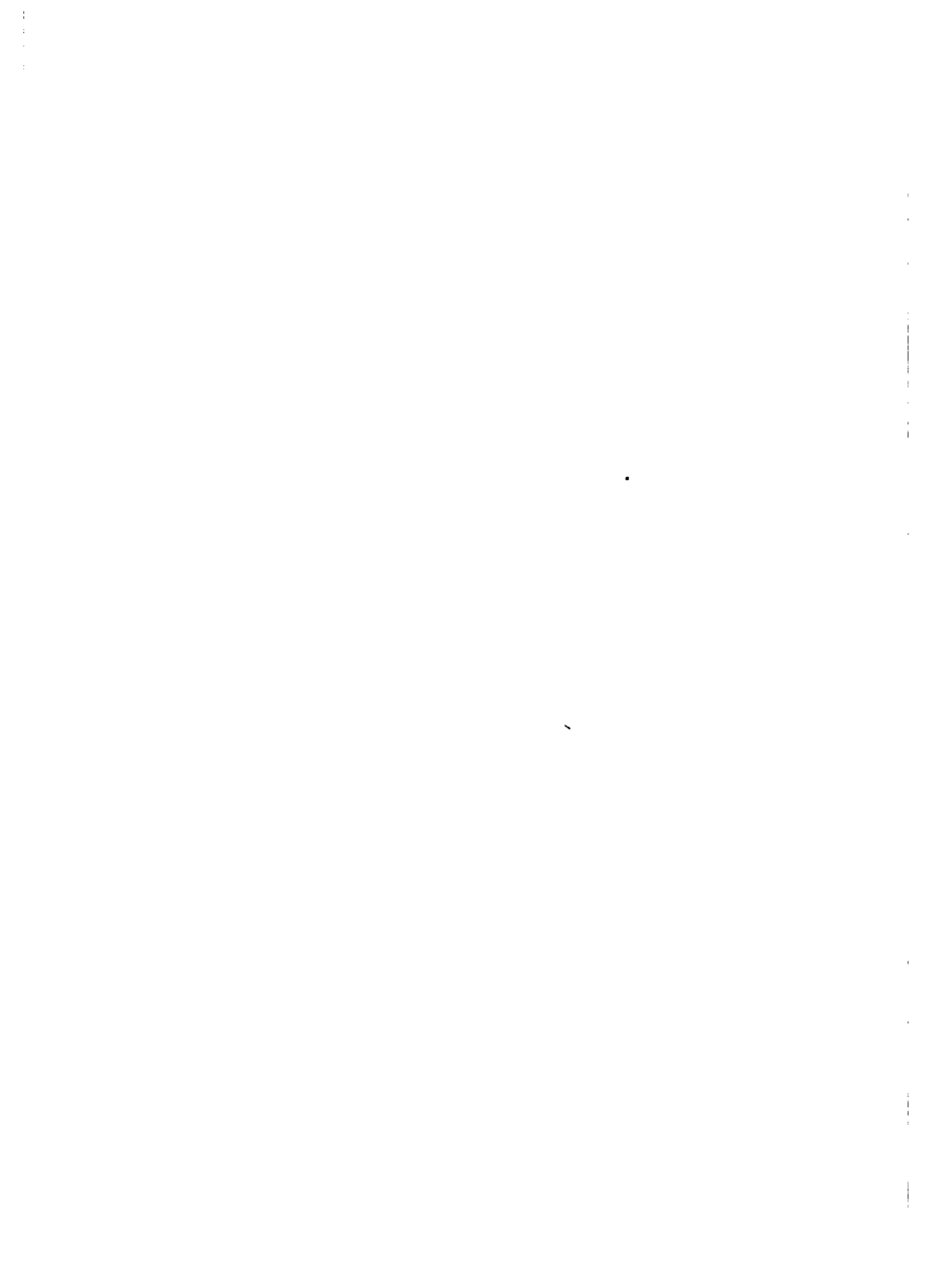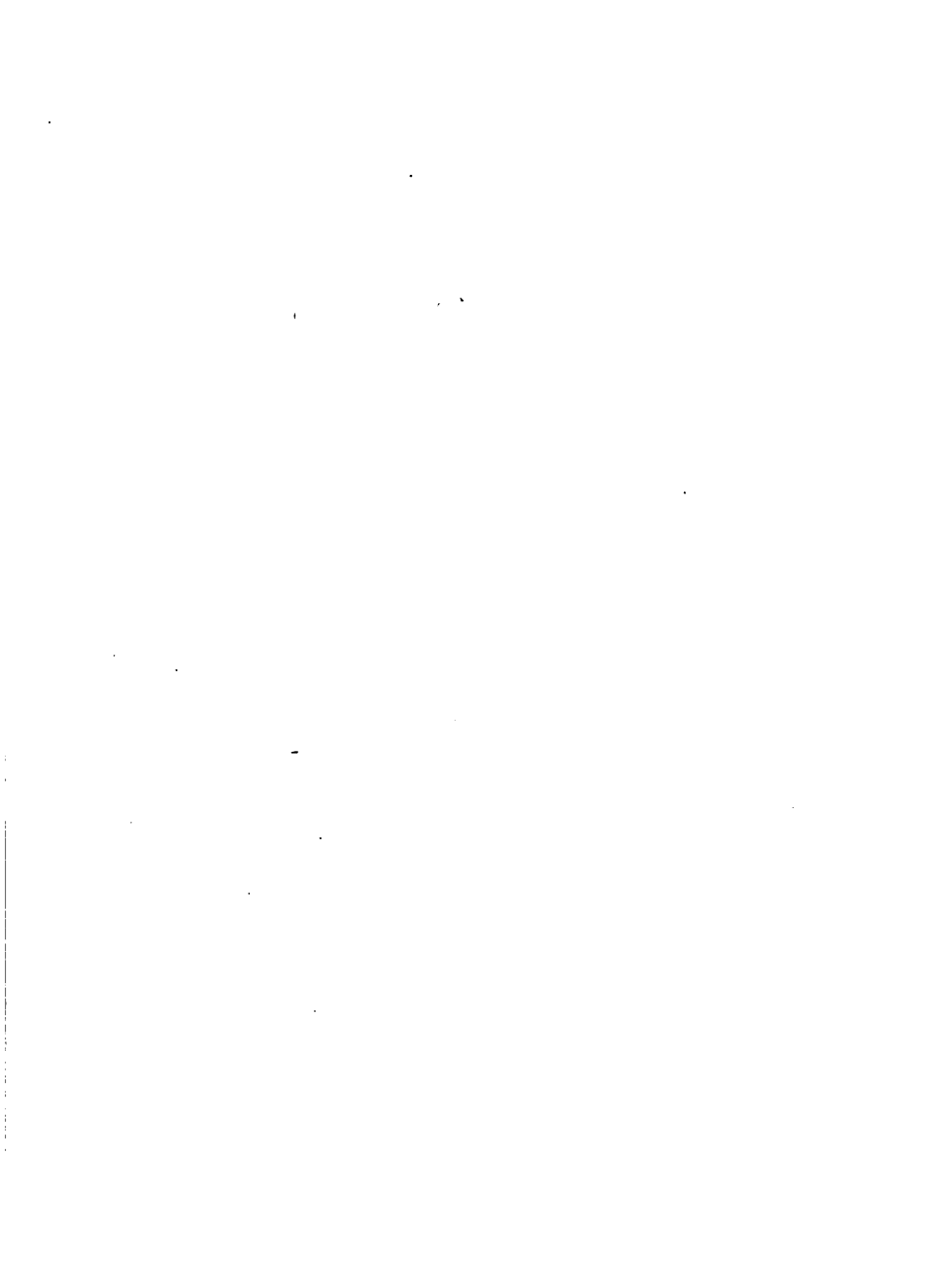
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BONNAZ AND EMBROIDERY MACHINES.

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INDUSTRIAL ARITHMETIC

FOR VOCATIONAL SCHOOLS

BY

MARY L. GARDNER

AND

CLEO MURTLAND

REVISED

FOREWORD

THE makers of this Trade School Arithmetic assume that the pupils who use the book already have a working knowledge of all the necessary arithmetical processes. The emphasis, therefore, is laid upon the content of the problem, upon the meaning of the result obtained—its bearing upon the trade work or upon the subject under discussion. Hence only actual or *live* problems are presented, and a live interest in them may reasonably be expected.

Since the object of trade instruction is to produce a worker, who has acquired not merely the necessary mechanical skill, but who has learned to combine intelligence and interest with skill, great care has been taken in arranging these problems to dwell upon such features of the various trades as will be likely to arouse and stimulate the personal interest of the pupils.

Serving as a background for the purely trade problems are a number of significant industrial and civic problems. A few historical problems, also, are given to show the connection between past and present economic conditions, particularly those related to the trades in which women and girls are engaged.

The aims of the problems presented in this book are:

To give methods for hand work, such as The Planning of Sample Cards, The Making of Tucks, Hems, Folds or Hat Facings.

To stimulate in the pupils an interest in the kinds, the quantities used, and the cost, of materials handled.

To show how, under actual trade conditions, the costs, profits and losses are reckoned. (See problems in Dressmaking, Factory Sewing, The Cutting of Box Foundations, etc.) The fact that these costs, profits and losses vary, gives opportunity for the making of many new and live problems.

To give rudiments for the planning of work, as, for instance, cutting material without waste. (See Practical Estimates, pages 40 and 91, and How Saving Affects Profits, page 87.)

To add to the worker's interest in *earning* money, an interest in the wise *use* of money.

To direct the attention of trade pupils to some undesirable social conditions by means of such problems as those based on sweatshop work.

To arouse in dressmaking and millinery pupils an interest in the textiles upon which they work and to familiarize them with the history, the processes of cultivation and manufacture, and the commercial value of these fabrics.

That these aims are not impossible of realization

is being demonstrated in a gratifying measure by the work done in the Manhattan Trade School for Girls, where the pupils take a lively interest in the working out of such problems. They appreciate, to some extent at least, the connection of the problems with their industrial life.

The authors wish to express their sincere and grateful appreciation of the valuable assistance so generously given in the preparation of this work, by Prof. Mary Schenck Woolman, Miss Helen R. Hildreth, and the supervisors and trade teachers in the Manhattan Trade School for Girls. They wish also to recognize here the services of the merchants and manufacturers who contributed helpful material to that part of the work dealing with store and factory problems.

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MARY L. GARDNER,
CLEO MURTLAND.

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New York City, October 1, 1910.

SUGGESTIONS TO TEACHERS

THESE problems are not offered in isolation as " busy work " or as " arithmetic for arithmetic's sake." They should not be separated from the work room and from the larger industrial interests of the pupils. Hence:

It is necessary to get a first-hand knowledge of the demands of the trade by doing a certain amount of the actual hand work involved and broadening this knowledge by conferences with the trade teachers and frequent visits to the work rooms.

Topics like Measurements for Hems and Tucks (page 23), Measurements for Hats (page 1), Cutting Gauges (page 23), and Planning of Sample Cards (page 71), should not be limited to the small number of problems in the book (which are merely suggestive) but should be amplified by those drawn from the daily trade work. These exercises, which require from six to twelve or more lessons, according to the work involved and the ability of the pupils— are given for the purpose of teaching the use of the tape measure and the application of small fractions to hand work.

Before attempting to teach any set of problems, get at their significance by comparing them with other groups dealing with the same kind of work. For instance, note that Measurements for Tucks, Hems, and Ruffles, Practical Estimates for Garments, Buying and Selling, etc., apply equally to hand sewing and factory sewing. In a similar way contrast Sewing (page 23) with Factory Sewing (page 55), and Factory-made Hats with Hand-sewed Hats as to the length of the season, the wages, and other conditions.

Require careful solutions, terse statements, both in oral and written work. Discourage the use of meaningless expressions, even though tradition may sanction them.

Avoid the use of the term "answer." It is not businesslike. Substitute the general term "result." Always require the concrete name of the result— wages per day, number of yds. needed, per cent of child laborers, etc. This is "practical" work in English.

The trade problems in this book will be found useful in connection with the teaching of fractions and of percentage, in all schools where trade classes for girls exist. They may also be used in the teaching of geography, civics and history as aids in demonstrating the interrelation of parts and unity of the social frame-work.

CONTENTS.

INDUSTRIAL ARITHMETIC

FOR VOCATIONAL SCHOOLS

I

MILLINERY.

1

(a) WIRE HAT FRAME.

1. Take the measurements of a straight-brimmed sailor and arrange them in order in your measurement book.
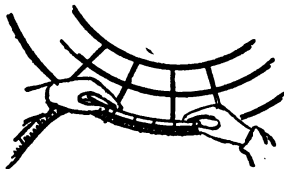
(b) POSITION OF THE TAPE MEASURE.

2. In the same way take the measurements of a mushroom sailor and write them in your measurement book.

3. Take the measurements of a box turban and write them in your book. What is a box turban? What is the coronet?

4. Take the measurements of a bell-crowned sailor and write them in your book. How can your book show that the crown is bell-shaped?

5. Take the measurements of an old lady's bonnet, write them in your book, and make a sketch of the frame.

6. If you wished to buy velvet or silk for a plain facing for a hat, what part of the hat should be measured to find out how much material is needed?

Things to Find Out.

1. What is meant by " headsize "?

2. What is the " edge wire "?

3. What is meant by " height of side crown "?

4. What part of the hat is called the " tip "?

5. Name the various materials used for making hat frames.

6. Which of these are used for braid hats?

7. Which are used for velvet or satin-covered hats?

8. Which are used for malines or chiffon-covered hats?

9. How is a hat blocked by hand?

2

HAT FACINGS—PLAIN AND GATHERED.

An Illustrative Problem.

How many widths of malines 29 inches wide are needed for the facing of a hat having an edge wire 46 inches long? How many yards of malines are needed if the brim is 7 inches wide?

46 inches = length of edge wire;

× 5 (times for fullness);

230 inches of malines. For the 230 inches as many widths are needed as 29 inches, the width of the malines, is contained times in 230 inches, or

29)230

7$\frac{27}{29}$, or 8 widths.

7 inches = width of brim;

1 inch for turnings;

8 inches of malines needed for 1 width.

× 8

64 inches of malines, or 1 yard, 28 inches for 8 widths.

In cutting this facing the amount used for turnings can be slightly decreased so that 1¾ yards of malines will be enough for the facing.

NOTE.—For illustration, see cutting of ruffles, page 30.

For gathered hat facings the following allowances are usually made for fullness:

Velvet ..... 1¾   times the length of the edge wire.
Silk .... 2 to 3 " " " " " "
Chiffon .... 3 to 4 " " " " " "
Malines .... 4 to 5 " " " " " "

1. How many widths of malines 30 inches wide are needed for the facing of a hat having a 40-inch edge wire? How many yards of malines are needed if the brim is 6 inches wide?

2. Into how many 6½-inch widths can 1½ yards of chiffon be cut? How many yards of hat facing can be made from these widths if the chiffon is 32 inches wide?

3. How many yards of silk 27 inches wide are needed for the facing of a hat having a 48-inch edge wire and a brim 5¾ inches wide?

4. A hat facing is to be cut from 1¼ yards of velvet 19 inches wide. How much of the velvet will be used for the facing of a hat brim having an edge wire 40 inches long and brim 5 inches wide? How much velvet will be left?

5. There are 5 widths of 30-inch wide malines to be used for the facing of a hat. What is the length of the edge wire of the hat if 4½ times the edge wire is used for fullness?

6. Measure a hat brim and estimate the number

of yards of 30-inch wide malines required for a facing.

7. Measure a hat frame and estimate the number of yards and cost of chiffon 36 inches wide required to cover the entire hat.

Things to Find Out.

1. In problem 2, can the fraction of a width be used? Why?

2. Why is there no attention given to seams in making malines and chiffon facings?

3. How wide should the material be cut for the facing of a hat having a brim wider on one side than on the other?

3

FOLDS.

1. How many strips $2\frac{1}{2}$ inches on the bias for folds can be cut from 1 yard of bias silk?
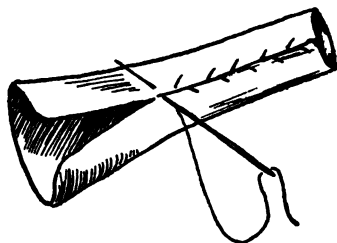
(a) PLAIN FOLD.

2. How wide should velvet be cut for a plain fold that is to be ¾ inch wide when finished? For a French fold of the same width? .

3. When 2 inches of bias silk will make one plain fold, how many yards of bias silk will be needed for 1 dozen folds of the same width?

4. How many strips 1⅛ inches wide for a French fold can be cut from 1¼ yards of bias silk? If the length of each strip is 1 yard, 10 inches, how many
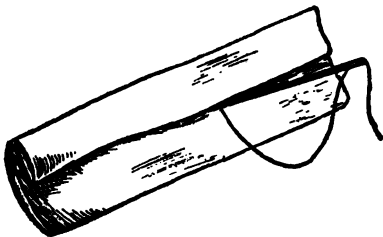
(b) FRENCH FOLD.

yards of bias fold can be made from the silk? (No allowance for seams.)

5. If the true bias from selvage to selvage is *approximately* ⅓ longer than the width of the goods, how many bias strips must be cut from silk 18 inches wide in order to have 3 yards of bias fold?

6. Which makes the wider fold, 3 inches *on* the bias or 3 inches *through* the bias?

Things to Find Out.

1. What is a plain fold?
2. What is a French fold?
3. How are folds cut?

4

TUCKING AND SHIRRING.

1. How much material is required for 1 quarter-inch tuck? For 4 quarter-inch tucks? For 4 eighth-inch tucks?

2. In a hat facing which is 8 inches wide there are to be 5 quarter-inch tucks. How wide should it be when ready for the hat?

3. A piece of chiffon was 10 inches wide before it was tucked, but after it was tucked it was only 6 inches wide. How many quarter-inch tucks were made?

4. The brim of a hat is 6 inches wide and is to be faced with shirred malines. How wide should the malines be cut if there are to be 6 quarter-inch tucks for the shirring?

5. There were 7 quarter-inch tucks for cording made in a piece of silk. How many inches were used for tucks? If the silk was 8 inches wide when finished, how wide was it before it was tucked?

Things to Find Out.

1. How many ways may shirring be done? Which requires the greater amount of material?

2. What is meant by '' cording ''?

5

MILLINERS' SUPPLIES.

Oral Exercise.

1. At 12½¢ a yard, what is the cost of 12 yards of crinoline?

2. A piece of cape net containing 23 yards costs $3.45. What is the cost of 1 yard?

3. At 4¾¢ a yard, what is the cost of 3 pieces of crinoline of 48 yards each?

4. At $4 a dozen sheets, what is the cost of 1 sheet of willow?

5. At 25¢ a yard, what is the cost of 6 yards of buckram?

6. Find the cost of 8 spools of tie wire at $3 a dozen spools.

7. Find the cost of 2 dozen rolls of silk hat wire at 6½¢ a roll.

8. Find the cost of 2½ dozen rolls of cotton hat wire at 35¢ a dozen rolls.

9. What is the cost of 20 yards of marceline at 22½¢ a yard?

10. At 37½¢ a yard, what is the cost of 12 yards of hat braid?

11. Hat braid that cost $3 a dozen pieces was sold at 37½¢ a piece. What was the gain on 1 dozen pieces?

12. Wire hat frames that cost $3.60 a dozen were sold at 50¢ each. What was the gain on 1½ dozen frames?

13. A milliner paid $4.50 for a dozen buckram frames and sold them at 75¢ each. How much did she gain? What was the gain per cent?

14. How many dozen wire frames at $3.60 a dozen can be bought for $5.40?

15. At 19¢ each, how many dozen bandeaux can be bought for $3.80?

Written Exercise.

1. At 75¢ a dozen, what is the cost of 54 frames?

2. At the wholesale rate of 8 frames for $1, what is the cost of 5 dozen frames? Of 12 dozen frames?

3. How many dozen wire frames can be bought for $7.20, when 1 gross cost $28.80?

4. A dealer bought a gross of wire at $4.23. There are 53 rolls in a gross. From one roll three frames are made and sold at 25¢ each. What is the gain on the entire 53 rolls if the dealer paid 10¢ each for the making of the frames?

5. A milliner bought 2½ dozen buckram frames at $3.60 a dozen. She sold ⅔ of them at 75¢ each, but the others were not sold. Did she gain or lose? What per cent?

6. A milliner bought 2 pieces of hat lining, one containing 46½ yards, the other 63⅓ yards. She sold 12½ yards, 9¾ yards, and 4⅜ yards: How many yards remained?

7. A milliner bought 63½ pieces of rice net, each piece containing 12 yards. The wholesale price was 4¢ a yard, the retail price 20¢ a yard. What was the total gain? What was the gain per cent?

8. A milliner bought a piece of marceline containing 24 yards at 25¢ a yard. From 1 yard she cut 6¾ hat linings. How many linings of same size were cut from the piece? These linings were sold at 10¢ each. What was the gain on the entire piece?

9. There are 48 yards in 1 piece of crinoline. When 1¼ yards are used to cover 1 frame, how many similar frames can be covered from 1 piece of crinoline?

10. Find the cost of 16 pieces of braid at 12½¢ a yard, each piece containing 13¾ yards.

11. Hat braid that cost $4.68 a dozen pieces is sold at 59¢ a piece. What is the gain on 2¼ dozen pieces?

12. A milliner bought 2½ dozen pieces of hat braid for $9. She sold 22 pieces at 50¢ each, and the remainder late in the season at 25¢ each. Did she gain or lose? What per cent?

Things to Find Out.

1. From what materials are crinoline, marceline, and cape net made?

2. From what materials are buckram and willow made?

3. From what materials are hat braids made?

4. Mention the different kinds of hat braids in common use.

5. Why are some of these braids expensive and others inexpensive?

6

HAT TRIMMINGS.

Oral Exercise.

1. What is the cost of 6 yards of French malines at 37½¢ a yard?

2. What is the cost of 3¾ dozen feathers at 80¢ each?

3. What is the cost of ¾ dozen feathers at $24 a dozen?

4. What is the cost of 7 dozen ornaments at 87½¢ a dozen?

5. If 3 feathers cost $2.25, what will 1 dozen feathers cost?

6. What is the cost of 1½ dozen artificial roses at the wholesale rate of 3 for 25¢?

MAKING HATS BY HAND.

7. At $1.50 for ¾ of a yard of velvet, what is the cost of 1½ yards?

8. For 1½ yards velvet I paid $1.43. What was the price of 1 yard?

9. Into how many 1½-yard lengths can 7½ yards of ribbon be cut?

10. How many ¾-yard lengths can be cut from a piece of ribbon 9 yards long?

11. When ⅝ of a yard of velvet makes a flange for 1 hat, how many yards are required for flanges for 3 hats of the same kind?

12. How many hats, each requiring 6¼ yards of ribbon, can be trimmed from 75 yards?

13. At $72 for 2 gross of pompons, what is the cost of $\frac{7}{12}$ of a dozen pompons?

14. If ⅞ yard of velvet cost 84¢, how many yards can be bought for $9.60?

15. One yard of lace cost ⅜ dollar. How many yards can be bought for $37.50?

16. At 37½¢ a yard, how many yards of chiffon can be bought for $75?

17. Chiffon that cost 60¢ a yard was sold for $1 a yard. What was the gain per cent?

18. Chiffon that cost 98¢ a yard was sold at $1.30 a yard. What was the gain on 25 yards?

19. Ribbon that cost $2 a bolt, 10 yards to the bolt, was sold at 19¢ a yard. What was the loss on 2 bolts of ribbon?

20. At 62½¢ a bolt, how many bolts of ribbon can be bought for $62.50?

21. At 75¢ a yard, how many yards of silk can be bought for $6.75?

22. Roses were bought 3 for $1 and sold at 50¢ each. What was the gain on 1 dozen roses?

23. Violets cost $10.80 a dozen bunches and were sold at $1.25 a bunch. What was the gain on one dozen bunches?

24. A milliner bought ½ dozen hat ornaments at $4 a dozen. They were not popular, and at the end of the season she sold them out at 15¢ each. How much did she lose?

25. Natural quills cost $9 a dozen. At what price each must they be sold to gain $5.40 a dozen?

Written Exercise.

1. A dozen feather ornaments cost $8.64. What was the cost of one? How many gross can be bought for $129.60?

2. Flowers that were bought at $5.50 a dozen bunches were sold at 75¢ a bunch. What was the gain on 1½ dozen bunches?

3. A milliner bought 10 bolts of ribbon, 10 yards to the bolt, from a jobber for $8.50. Ten per cent of the ribbon was not salable because it was soiled. The good ribbon was sold at 19¢ a yard. What was the gain?

4. Ostrich plumes that cost $48 a dozen were sold 90 per cent above cost. What was the selling price of each plume?

5. Fancy feathers that cost $15 a dozen were sold at $2 each. What was the gain per cent?

6. Violets that cost $95 a gross were sold for $1.25 a bunch. What was the gain per cent?

7. Velvet that cost $1.55 a yard was sold for $2 a yard. What was the gain on 12½ yards?

8. A milliner bought 16 yards of velvet at ¾ of a dollar a yard and sold it at ⅞ of a dollar a yard. What was her profit? What was the gain per cent?

9. The wholesale price of French malines was 21¾¢ a yard and the retail price 30¢. What was the gain on 275 yards? What was the gain per cent?

10. A 36-yard piece of domestic malines cost $7.02 and' was sold at 29¢ a yard. One yard was lost in cutting. How much was gained on the piece?

11. A box of velvet containing 12 yards was bought for $28.20 and sold for $2.75 a yard. How much was gained on the piece?

12. A milliner bought a piece of silk containing 36 yards for $30.50; ⅓ of it was damaged so that it could not be sold and the remainder was sold at 75¢ a yard. How much did she lose? What per cent?

13. She bought 6 pieces of malines, 34½ yards to the piece, for $41.40 and sold it at 29¢ a yard. How much did she gain?

14. She bought 6 bolts of velvet ribbon, 10 yards to the bolt, for $15 and sold it for 60 per cent more than it cost her. What was the selling price per yard?

15. A wholesale millinery firm bought 3 gross of artificial roses for $72. During the season ¾ of them were sold at $4 a dozen, and the remainder, after lying in stock over season, were sold 4 for $1. Did the firm gain or lose? What per cent?

Things to Find Out.

1. From what is malines made?

2. From what is chiffon made?

3. What is the difference between French and domestic malines?

4. In problem 11, page 13, what is meant by a '' flange ''?

5. Mention some materials that are used for making pompons.

6. Mention some materials that are used for making artificial flowers.

7

SOME PROBLEMS ON THE SELLING OF HATS.

1. The chenille braid used on a hat cost $3.75, an ostrich plume $2.25, and making $2.50. For how much must the hat be sold to gain 90 per cent?

2. The materials for a hat cost $5 and the making $3.50. The making of the hat was what per cent of the total cost?

3. My hat cost $9.75. Of this amount 40 per cent was paid for the making of the hat. What was the cost of the materials?

4. I bought a hat for $18.50 and had only 60 per cent of the money with me when I made the purchase. How much do I owe?

5. The wholesale prices for the materials for a hat were as follows: 5 yards velvet ribbon at 40¢ a yard, 6 bunches of roses at 90¢ a bunch, and 14 yards of straw braid at 12½¢ a yard. The milliner charged $3.50 for making the hat and sold it so as to gain 40 per cent of the total cost. What was the customer's price?

6. The wholesale prices for the materials for a hat were as follows: 15 yards braid at 22¢ a yard, ¾ of a yard velvet at $2 a yard, 1 feather at $15. What was the gain if the retail prices were 45¢ a yard for the braid, $2.50 a yard for the velvet, and $18.75 for the feather? What was the gain per cent?

7. A milliner bought 1½ dozen Milan hats at $36 a dozen and sold ⅔ of them at $5 each. The others remained unsold at the close of the season and were marked down 40 per cent. How much was gained on all the hats? What was the gain per cent?

8. A milliner bought 2 dozen blocked hats at $10

a dozen. She sold ⅔ of them at $1.50, but the others were sold at 79¢ each at the close of the season. What did she gain on the sale of the hats? What was the gain per cent?

9. The materials for a hat cost $15.60. They were sold at 50 per cent above cost and $7.50 was charged for the making of the hat. What was the customer's price?

10. A customer paid $50.60 for a hat. This amount was 80 per cent more than the milliner's cost. What was the milliner's cost?

11. In selling a hat which was marked $63 a milliner found it was marked 80 per cent above cost. How much can she reduce the price of the hat and still gain 50 per cent?

12. A spring hat was marked $65 and later reduced 20 per cent. At the close of the season it was still on hand, and the milliner, by reducing the price 25 per cent more, succeeded in selling the hat. How much did she receive for it?

Things to Find Out.

1. What is meant by '' wholesale ''?

2. What is meant by '' retail ''?

3. How does the jobber's business differ from the wholesale business?

4. What is a blocked hat?

5. Who benefits by a discount?

6. What is a Milan hat?

7. How many kinds of Milan are used?

8

IMPORTED HATS.

1. A milliner paid $32.50 for a hat in Paris and 60 per cent duty on it in New York. What was the cost of the hat? The hat was marked $90. The marked price was what per cent of the cost?

2. The hat was not sold, but was re-made the next season at an expense of $6 and sold for $50. What was the loss per cent?

3. A Paris hat, including 60 per cent duty, cost a milliner $26. The hat was not sold, but was used two seasons for a model. The first season 8 copies were made at a cost of $12.50 each and sold for $22 each; the second season 12 copies were made at a cost of $15 each and sold for $25 each. What was the gain on the transaction?

4. A clever milliner copied a $70 pattern hat in Paris for $25 and paid 60 per cent duty in New York on the copy. What was the net cost of the hat? What was the gain per cent?

5. She made 15 copies of this hat in New York at a cost of $25 each and sold them for $50 each. What was the entire gain if the pattern was sold at the close of the season for $25? What was the gain per cent?

6. The cost of 8 Paris hats, including duty, was $300. These hats were copied in New York for $18.50 each and sold to customers as imported hats for $40 each. How many copies would the importer have to sell to cover the cost of the pattern hats?

Things to Find Out.

    1. What is meant by " duty "?

    2. Why are milliners' profits so large?

    3. What is a pattern hat?

    4. What is meant by " net cost "?

9

MILLINERS' SALES AND PROFITS.

    1. A milliner bought $950 worth of goods and received 6 per cent discount for cash. For how much must she sell the goods to gain 60 per cent?

    2. Of the $125 paid out for a week's expenses $35 was paid to the trimmer, $8.50 each to the two improvers, and $6 to the errand girl. What per cent of the week's expense money was paid for labor?

    3. A milliner's profits one year were $1,650. The profits were 45 per cent of the year's receipts. What were the receipts?

    4. The week's expenses for a certain millinery establishment were $125. The sales for the week amounted to $190.75, but one customer owing $24.50,

another owing $36.75, and another owing $22.50, failed to pay their bills promptly. What per cent of the week's expenses must be taken from the working capital?

5. During the busy season the net profits for 1 week were 60 per cent of the receipts. If $50.24 were the week's expenses, what were the receipts for the week?

6. The week's profits were $45.60. The profits • were 37½ per cent of the week's receipts. What were the week's receipts? What were the week's expenses?

7. During the spring season a milliner's net profits were 66⅔ per cent of the receipts; during the dull summer season there was a loss of 33⅓ per cent; during the fall season the profits went up again to 75 per cent, and during the dull season before and after Christmas the loss was 41 per cent. What was the average profit for the year?

8. A milliner who did $13,200 worth of business one year paid 25 per cent of the amount for rent and light, 40 per cent for salaries, 5 per cent for packing and delivery of hats, and lost 2 per cent in bad debts. How much was paid for each item of expense, and what were the total expenses for the year? What were the profits?

9. She used 25 per cent of the profits for her own expenses and ⅔ of the remainder for new stock for the next year. The remainder was left in the bank. How

much had she in the bank to begin the next year's business?

10. The following year, however, the business was less profitable. After paying 65 per cent of the year's receipts for running expenses, etc., she had only $1,314.60 left. What was the amount of the year's business? What per cent did her profits decrease?

* **Things to Find Out.**

    1. What is working capital?

    2. What is meant by a " season "?

    3. What is the length of each millinery season?

    4. What things are included in the expense of packing and delivering goods?

    5. What is meant by " bad debts "?

    6. What is " net profit "?

    7. Name the things included in the expense of running a business.

    8. Which is the largest item of expense?

II

SEWING.

1

1. Cut the gauges for a 1-inch hem. Turn the hem in a piece of paper or lawn and test to see if it is perfectly straight. How much material is taken up by the hem?

2. Cut the gauges for a $\frac{5}{8}$-inch hem. Turn the hem in a piece of paper and test to see if it is perfectly straight. How much material is taken up by the hem?

3. Cut a quarter-inch gauge and make 1 quarter-inch tuck. How much material is taken up by 1 tuck? By 6 tucks?

4. Cut the gauges for quarter-inch tucks with quarter-inch spaces showing between the tucks. Cut a half-inch gauge.

5. With these gauges make, in a piece of paper 6 inches wide, a half-inch hem and 3 quarter-inch tucks, with quarter-inch spaces showing between the tucks.

6. How much material is taken up by a half-inch hem and 3 quarter-inch tucks?

23

7. How much material is taken up by a hem? By a tuck?
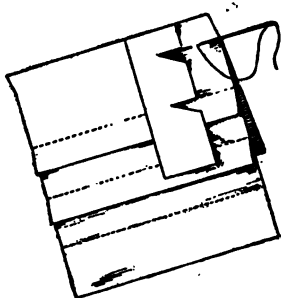
· MEASURING FOR TUCKS FROM STITCHING TO FOLD.

8. The muslin for a ruffle is 9 inches deep. In it I wish to put a 1-inch hem and 3 half-inch tucks. How wide should it be when finished?

Illustrative Problems.

A piece of lawn containing 6 eighth-inch tucks and half-inch hem is nine inches wide. How wide was it before it was tucked and hemmed?

 9 in. = width, finished;

 $1\frac{1}{2}$ in. = taken up by 6 quarter-inch tucks ($6 \times \frac{1}{4}$);

  $\frac{3}{4}$ in. = half-inch hem and * turning;

 $11\frac{1}{4}$ in. = width before it was tucked and hemmed.

 * From $\frac{1}{8}$ to $\frac{1}{4}$ of an inch is used for the first turning in making hems. In these problems $\frac{1}{4}$ of an inch is used except for very narrow hems when $\frac{1}{8}$ of an inch is used.

The lawn for the front of a shirt waist is 34 inches wide. In it there are to be made 30 sixteenth-inch
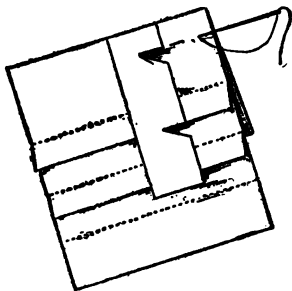
MEASURING FOR TUCKS FROM FOLD TO FOLD.

tucks. How wide should the lawn be after the tucks have been made?

$$34 \text{ in.} = \text{width of the lawn;}$$
$$30 \times \tfrac{1}{8} \text{ in.} = 3\tfrac{3}{4} \text{ in. taken up by the tucks;}$$
$$30\tfrac{1}{4} \text{ in.} = \text{width of lawn after being tucked.}$$

2

TUCKING PROBLEMS.

Written Exercise.

1. The back of a corset cover was 20 inches across when finished. It had in it 3 groups of tucks, each group taking up 1¼ inches of cloth. How wide was the piece before it was tucked?

2. How much lawn is taken up in 3 groups of tucks, the first group containing 6 one-inch tucks, the second group 6 half-inch tucks, and the third group 12 eighth-inch tucks?

3. A piece of muslin 29 inches wide was tucked and when returned to the teacher was only 14 inches wide. How many quarter-inch tucks were made in it?

4. Before tucking, a piece of goods was $\frac{3}{4}$ of a yard long. After tucking, it was $\frac{1}{2}$ yard long. How many eighth-inch tucks were made?

5. How many half-inch tucks must be put in a skirt that is 3 inches too long in order to make it the right length? How long should it be when finished if it is 42 inches long now?

6. I wish to put 3 two-inch tucks in a skirt which is to be 40 inches long. How long must the skirt be cut to allow for the tucks and a 3-inch hem?

7. The muslin for the back of a corset cover is 24 inches wide. How many eighth-inch tucks can be made in order that the back may be 22 inches wide when finished?

8. My goods for a ruffle is 10 inches deep. It is to have a 2-inch hem and 6 eighth-inch tucks. How deep should it be when finished?

9. How deep must a ruffle be cut to be 5 inches deep when finished, if there is to be a 1-inch hem on the bottom and 5 eighth-inch tucks above the hem?

10. How deep a ruffle can be made from a strip of

lawn 18 inches deep, if a 2-inch hem is put on the bottom and above it 3 half-inch tucks?

11. The lawn for a shirt waist is 30 inches wide. How many eighth-inch tucks can be made in the lawn if it is to be 24 inches wide when finished?

12. How many inches of material are taken up by 11 groups of tucks, each group containing 5 sixteenth-inch tucks and 1 quarter-inch tuck? How wide was the material before it was tucked if it was $17\frac{5}{8}$ inches wide when finished?

13. A piece of lawn has 28 quarter-inch tucks $\frac{1}{2}$ inch apart, with $\frac{1}{2}$ an inch showing at each selvage. How wide was the material before it was tucked?

14. A piece of cloth has 16 half-inch tucks, with an inch space showing between the tucks and a half-inch showing at the top and bottom of the cloth. How long was the cloth before it was tucked?

15. How many quarter-inch tucks can be made in a piece of cloth $18\frac{1}{4}$ inches long if there are quarter-inch spaces between the tucks and a quarter of an inch space showing at the top and bottom of the piece?

16. The lawn for strip tucking was 36 inches wide before it was tucked and when finished it was $24\frac{1}{2}$ inches wide. How many eighth-inch tucks were made in the lawn? How wide were the spaces showing between the tucks if 1 inch showed at one selvage and $\frac{5}{8}$ of an inch at the other selvage?

Illustrative Problems.

From 1 yard of lawn 32 inches wide, how many widths 8 inches deep can be cut? How
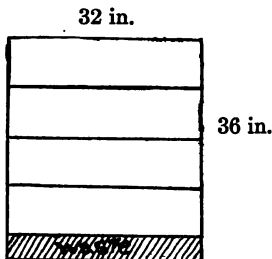
32 in.

36 in.

many yards of ruffling can be made from these widths?

1 yard = 36 inches.

8)36

    4($\frac{1}{2}$) widths—the half width cannot be used for this ruffle.

    32 inches = length of 1 width;

$\times$ 4

36)128 inches = length of 4 widths;

    3 $\frac{5}{9}$ yards of ruffling.

How many yards of long cloth 36 inches wide are
needed for 3½ yards of ruffling which is to be cut 6
inches deep?
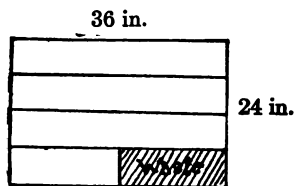
36 inches = the length of 1 width.

For 3½ yards of ruffling as many widths are needed
as 1 is contained times in 3½, or

    1)3½

      3½ widths.

In order to get 3½ widths, however, 4 widths must
be bought.

    6 inches = depth of 1 width;

 × 4

    24 inches, or ⅔ yard = depth of 4 widths;
     ⅔ of a yard of long cloth needed for the ruffle.

3

RUFFLES—STRAIGHT AND BIAS.

Oral Exercise.

1. How many ways can ruffles be cut? How much is added to a muslin ruffle for fullness? To a lawn ruffle? To a chiffon ruffle?

2. How many yards of ruffling are needed for 1 dozen aprons, if each apron is 1 yard wide, and half the width of the apron is added for fullness?

3. How many pieces of lawn 36 in. wide are needed for the ruffle for 1 apron? For a dozen aprons?

4. How many pieces of muslin 36 inches wide are needed for 3 yards of ruffling? For $3\frac{1}{4}$ yards of ruffling? If these pieces are sewed together, how many yards of ruffling will there be?

Written Exercise.—Straight Ruffles.

1. A petticoat measures 3 yards around the bottom. How many yards of ruffling are needed for it? If the ruffle is 9 inches deep before making and is cut from material 1 yard wide, how many yards of material are needed for the ruffle?

2. A lawn dress measures $3\frac{1}{2}$ yards around the bottom. It is to have a ruffle 10 inches wide, finished, in which is a 2-inch hem and 4 eighth-inch tucks. How

wide must be the ruffle be cut? How many yards of ruffling are needed?

3. How many widths for ruffling can be cut from 4 yards of lawn, if the ruffle is 6 inches, finished, and has a ¾-inch hem and 5 eighth-inch tucks?

4. How many yards of ruffling can be made from 5 yards of nainsook 1 yard wide, if the ruffle, having a 2-inch hem and 6 eighth-inch tucks, is to be 6 inches deep when finished?

5. How many yards of ruffling can be made from 4½ yards of lawn 45 inches wide, if the ruffle, having an inch hem and 4 quarter-inch tucks, is to be 9 inches deep when finished?

6. A child's dress measures 2½ yards around the bottom. How many yards of ruffling are needed for two ruffles for this dress? The ruffle is to be 3¼ inches wide, finished; how wide must it be cut if it is to have an eighth-inch hem and 3 sixteenth-inch tucks?

7. How many yards of 36-inch wide Persian lawn are needed for two ruffles for the child's dress in problem 6?

Bias Ruffles.

1. What is *true bias?* Garment bias? Choice bias? Which is used for ruffles?

2. What is meant by " *on* the bias "?

3. What is meant by " *through* the bias "?

4. Fold a true bias. Cut 3 pieces of true bias 1 inch *through* the bias.
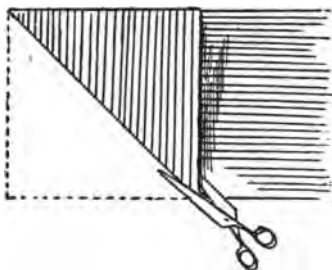
CUTTING OF TRUE BIAS.

5. Cut 3 pieces of true bias 2 inches *on* the bias.

6. Which will make the wide ruffle, 2 inches *on* the bias, or 2 inches *through* the bias?

7. From the same material cut enough 1-inch wide straight pieces (from selvage to selvage) to equal in length the 3 bias pieces.

8. If the bias pieces were sewed together and the straight pieces were sewed together, how would the two compare in length? How much longer, approximately, is one bias width than one straight width of the same material?

9. Which ruffle requires the greater number of widths, a straight ruffle or a bias ruffle?

10. If a bias width is approximately $\frac{1}{3}$ longer than a straight width of the same material, how many bias

widths are required for a ruffle which takes 6 straight widths? Which costs the more? Why?

11. Which requires the greater amount of fullness, a straight ruffle or a bias ruffle? Why?

4

DRESSMAKERS' SUPPLIES.

Oral Exercise.

1. Find the cost of 4½ dozen rolls of tape at 11¢ a dozen.

2. Find the cost of 12 pieces of seam binding at 11¢ each.

3. At $1.05 a gross, what is the cost of 3 gross of bias tape?

4. What is cost of 6 gross of pearl buttons at $1.35 a gross?

5. What is the cost of 4 dozen spools of cotton at 53½¢ a dozen?

6. What is the cost of 2 dozen spools of cotton at 53½¢ and 2 dozen spools at 53¢?

7. At $2.25 a dozen bunches, what is the cost of 1 bunch of whalebones?

8. Whalebones retail at 25¢ a bunch; how much does the dressmaker gain who buys them at the wholesale rate of $2.25 a dozen bunches?

9. A piece of lace insertion at 3½¢ a yard cost $1.26. How many yards were in the piece?

10. A 12-yard piece of insertion cost 42¢. What was the cost of 1 yard?

11. At 75¢ a gross, what is the cost of 1 yard of soutache?

12. At $3.60 a dozen boxes, what is the cost of 1 card of hooks and eyes, allowing one dozen cards to the box?

13. At $1.35 a gross, what is the cost of 1 dozen pearl buttons?

14. At 13½¢ a pair, what is the cost of 6 pairs of dress shields?

15. What is the cost of 1 skirt braid at $1.04 a dozen?

Written Exercise.

1. At 53½¢ a dozen spools, what is the cost of 2½ gross spools of cotton?

2. At $7.70 a gross, what is the cost of 6 dozen yards of silk collar bone?

3. Find the cost of 12 pieces of whalebone at $27 a gross.

4. At $3.84 a half gross, what is the cost of 1 yard of featherbone?

5. Find the cost of 12 pieces of stay binding at 54¢ each, and 10 gross of stay binding at 31¢ a dozen yards.

6. Find the cost of 10½ pounds of dressmakers' pins at 15¢ a quarter-pound.

7. A dressmaker paid $5.10 for 60 yards of silesia; what was the cost of 1 yard?

8. A dressmaker paid $7.31¼ for 32½ yards of percaline, which she made into French linings, each requiring 2½ yards. What was the cost of the percaline for each lining?

9. A dressmaker bought two pieces of white lining taffeta, one piece of 42 yards, and another of 48⅞ yards, at 42½¢ a yard. What was the total cost?

10. A piece of crinoline of 42½ yards, that cost $1.70, was made into dress models of 8½ yards each. What was the cost of each model?

11. A dresmaker buys soutache braid for 75¢ a gross and sells it at 1½¢ a yard. What is her gain on 2 gross? What is the gain per cent?

12. Hooks and eyes that cost a dressmaker $6.48 a gross are sold at 10¢ a card. How many cards must she sell to gain $2.75?

13. Two princess aprons can be cut from 7½ yards of chambray. How many aprons can be made from 40 yards of chambray?

14. A dealer in dressmakers' supplies bought 25 yards of lawn at 9½¢ a yard and received 6 per cent discount for cash. How much did the lawn cost?

15. He bought 22½ yards of cambric at 16⅔¢ a yard and received 5 per cent discount. It was sold at 20¢ a yard. What was the gain per cent?

16. A dressmaker bought $150 worth of silk, receiving 6¢ discount for cash. She sold the silk for 40¢ more than the original price. What was the gain per cent?

17. Button moulds that cost 55¢ a gross were sold at 10¢ a dozen. What was the gain on 3½ gross?

18. How many lengths of ribbon 2¼ yards long can be cut from 2 bolts of ribbon of 10 yards each?

19. A dressmaker has an order for 3 lingerie dresses for which 31½ yards of batiste are needed. She can buy 3 remnants of 10½ yards each at 25¢ a yard, or she can buy a piece of 35 yards at 25¢ a yard and receive 4 per cent discount for cash. Which is the better plan?

20. A dressmaker bought 18¾ yards of silk at 80¢ a yard for a dress and had 1⅜ yards left. How much did the silk used for the dress cost?

21. Find the cost of 36 yards of Valenciennes lace at 6½¢ a yard, 12 yards of insertion at 5½¢ a yard, and 12 yards of beading at 7¢ a yard. What is the net cost when 2 per cent discount is given?

22. How many lingerie shirt-waists, each requiring 2¾ yards, can be made from 49 yards of batiste? What is the cost of the material for 1 waist if the material cost $9.80 less 5 per cent discount?

Things to Find Out.

1. What is a French lining?

2. In problem 10, explain a " dress model "?

3. What is soutache braid?

4. What is the difference between silesia and percaline?

5

HOW ESTIMATES FOR GARMENTS ARE MADE.

1. It takes 3 yards of drilling for 1 middy blouse. How many blouses can be made from a 30-yard piece

MIDDY BLOUSE.

of drilling? At 10½¢ a yard, what is the cost of the drilling for 1 blouse?

2. The collars and cuffs for 2 middy blouses can be cut from ⅜ of a yard of flannel. How many yards

are needed for the collars and cuffs for 2 dozen blouses? At 41½¢ per yard, what is the cost of the flannel?

3. The braid used for trimming middy blouse collars is bought in 24-yard pieces. How many blouses can be trimmed from 1 piece, 3 yards to a blouse? How many pieces are needed for 1 dozen blouses? At 19¢ a piece, what is the cost of the braid for 2 dozen blouses?

4. From problems 1, 2, and 3, find the total cost of the materials for 2 dozen blouses. Add 25 per cent of cost of materials for the cost of making and selling, and find the manufacturer's cost.

——•——

5. How many yards of poplin are used for 2 dozen swimming suits, allowing 3 yards to each suit? At 19¢ a yard, what is the cost of the poplin for 2 dozen suits?

6. The findings for 1 suit are 9 buttons at 10¢ a dozen and ¾ yard of elastic at 8½¢ a yard. What is the cost of the findings for 2 dozen swimming suits?

7. The dealer charged 80¢ for the making of each suit and sold them to retail dealers for $2.25. What was his profit on the 2 dozen suits?

8. A dressmaker bought 2½ yards of Persian lawn at 25¢ a yard for a shirt-waist, 3½ yards beading at

12½¢ a yard, and 6 crochet buttons at 35¢ a dozen. What did the materials for the shirt-waist cost?

9. She sold these materials to a customer for 50¢ more than she paid for them and charged $2.50 for making the waist. How much did the waist cost the customer?

10. A woman bought 12½ yards of foulard silk at 95¢ a yard for a dress. What was the cost of the silk?

11. For trimming she bought 1¾ yards of net at $1.50 a yard and ¾ of a yard of plain silk at 79¢ a yard. What was the cost of the trimming?

12. The dressmaker charged her $2.50 for findings and $15 for making the dress. What was the total cost of the dress?

13. The chambray for working aprons cost 12½¢ a yard and the buttons 95¢ a gross. Find the cost of 2 dozen working aprons if for each apron 4½ yards of chambray and 3 buttons are used.

14. How many skirts can be made from a piece of muslin containing 56 yards, each skirt requiring 4 yards of material? What is the total cost if the material cost 18¢ a yard and the labor on each skirt 45¢?

Things to Find Out.

1. What is an estimate?

2. Name the items that are included in estimating the cost of garments.

6

PRACTICAL ESTIMATES FOR GARMENTS.

NOTE TO TEACHERS.—These advanced problems, which only the more capable girls can grasp, should not be presented until the processes of sewing are well established. There should be class discussions in connection with the work throughout, and as much experimentation as each problem permits. The estimates should be written out carefully; results need not necessarily be the same.

The aim of this type of work is to give the pupils the principles underlying the planning of good-looking garments with reference to economy of material and minimum cost. The work should be varied enough and continued long enough to enable the pupils, independent of others, to plan the cutting of simple garments with and without patterns, and to reckon their cost.

1. A plain white apron made of one width of lawn is 26½ inches long, finished. How much lawn is used for 1 apron (without the band) having a hem 3 inches deep?

2. The band for this apron is 28 inches long. How much lawn must be bought for the band? If only 1 apron is made what is the cost, the lawn being worth 9½¢ a yard?

3. How many apron bands 3¼ inches wide can be cut from 1 width of lawn 40 inches wide? For how many aprons can these bands be used?

4. How many yards of lawn 40 inches wide are needed for 1 dozen aprons of the size given in problem

1 with bands the size given in problem 3? What is the cost of 1 apron, lawn being worth $9\frac{1}{2}$¢ a yard? Compare this result with the result in problem 2. How much is the cost lessened when the lawn is used economically?

5. How many aprons of the same size can be made from a 40-yard piece of lawn?

6. Measure a child's petticoat and estimate the amount of muslin required for 1 petticoat. For a dozen petticoats.

7. Measure a kimono and estimate the amount of 30-inch lawn needed for 1 kimono. Lay the pattern on the lawn and estimate again. How do your results compare?

8. How many yards of madras 30 inches wide are needed for a plain tailor-made shirt-waist? Estimate the amount of material by measuring the waist. By laying the pattern on the material. How do your results compare?

9. How many yards of lawn 36 inches wide are needed for a tucked shirt-waist opened in the back? How many yards for the front? For the back? For the sleeves?

10. Measure a middy blouse and estimate the number of yards needed for 1 blouse. Is there much waste? How many blouses can be cut from a 30-yard piece of drilling?

11. The collar is $13\frac{1}{2}$ inches wide and 12 inches long.

How many collars can be cut from ¾ of a yard of flannel 41 inches wide?

PRINCESS APRON.

12. In making an estimate for 2 dozen princess aprons a dealer allowed 4½ yards of chambray for each apron, but in cutting the aprons he found that 7½ yards made two aprons. How many yards were saved on the order? What was the gain if the chambray cost 8½¢ a yard? Estimate the cost of 1 dozen aprons, including thread, buttons, and labor.

7

DRESSMAKING PROBLEMS.

1. A dressmaker bought 50 yards of taffeta silk for $37.50. She sold 10½ yards to one customer at 90¢ a yard, 13¾ to another customer at 85¢ a yard, and the remainder at cost. What did she gain on the entire piece? What was the gain per cent?

2. A Fifth Avenue dressmaker bought 50 yards of hand-made lace in Ireland for $75. She paid 60 per cent duty on the lace and sold it at a gain of 33⅓ per cent. What was the selling price per yard?

3. A dressmaker bought 16 yards of foulard silk from a retail dealer at 90¢ a yard and received a dressmaker's discount of 6 per cent. She sold it to a customer for 11¼ per cent more than the retail price. What did she gain on the sale? What per cent did she gain?

4. A dressmaker bought the following materials for a customer:

> 6½ yd. broadcloth at...........$2.75
> 12½ yd. silk for lining at......... .75
> 2 yd. trimming at............ 2.25

She received a dressmaker's discount of 6 per cent, and 5 per cent discount for cash payment. What did she pay for the materials? She sold these to her cus-

A SEWING WORK-ROOM.

tomer at retail prices. How much did she gain?
What per cent did she gain?

5. Pongee silk was offered at special sale for 85¢
a yard. A dressmaker bought 30 yards and received
a dressmaker's discount of 5 per cent. She sold 12½
yards to one customer at 90¢ a yard, and 10 yards
to another customer at 85¢ a yard, but the remainder
she was unable to sell. Did she gain or lose by the
transaction? How much?

6. A dressmaker bought a 7½-yard remnant of
broadcloth for $22.50. She sold 6 yards to a customer
for $3.50 a yard, but the remainder could not be sold.
Did she gain or lose? What per cent?

7. A dressmaker bought three 15-yard pieces of
dress silk in France at 5 francs (1 franc = 19.3¢)
per yard. After paying 60 per cent duty on the silk
she sold 2 pieces to one customer at 45 per cent gain,
and the third piece to another customer at 35 per cent
gain. What was the gain on the three pieces? Why is
this gain not a net gain?

8. For the materials for an evening gown a dress-
maker paid the following:

> 10 yards cashmere de soie..... at $2.50
> 1 embroidered bolero......... " 25.00
> 15 yards silk for lining....... " .65
> Findings ....:....... " 3.75

The dressmaker added 10 per cent to the cost of the

materials and charged her customer $40 for making the
gown. What was the customer's cost?

9. A dressmaker furnished the materials for a lawn
dress and charged her customer $25. For the materials
she paid the following prices:

> 10 yards Irish dimity.........at $0.45
> 12½ yards Cluny insertion........   .25
> Findings 2.00

If she charged $12 for the making, how much did she
gain on the materials? What per cent did she gain on
the materials?

10. A shop pays $2 each for tucking by hand and
making lingerie shirt-waists of a certain style. The
materials cost $1.50, and 50 per cent of the total cost is
added for overhead profit. The waists are sold at retail
for $7.50. What is the gain per cent?

11. The materials for a dress cost a dressmaker
$14.50. She sold them for 10 per cent more than cost
and charged $20 for making the dress. She paid her
helpers 20 per cent of the amount received for the
dress. What was her gain per cent?

12. A dressmaker agreed to make a dress for $25.
She paid each of her two assistants $1.50 a day for 3½
days' work on the dress. The dress was returned for
alterations and the two assistants were paid for 1 more
day's work on the dress. How much did the dressmaker
receive for her work and responsibility?

13. A dressmaker bought 50 yards of black lining silk for $31.25. She sold 60 per cent of it at a gain of 60. per cent and the remainder at a loss of 10 per cent. Did she gain or lose? What per cent?

14. She bought 75 yards of white lining silk for $41.25. She sold 75 per cent of the silk at a gain of 50 per cent and the remainder at 45¢ a yard. Did she gain or lose? What per cent?

Things to Find Out.

1. What is discount?

2. Explain how both the buyer and the seller profit by a discount.

3. Why do retail merchants give dressmakers a special discount?

4. What is meant in problem 10 by " overhead profit "?

8

DRESSMAKERS' RECEIPTS AND PROFITS.

1. A dressmaker's receipts were $175.20 one week. This amount was 133⅓ per cent of the previous week's receipts. What were the average receipts of the two weeks?

2. After paying her assistants 62½ per cent of the week's receipts a dressmaker had $31.20 left for her own use? How much did she pay her assistants?

3. A dressmaker's expenses for one week were $40.11. How much had she left for her own use if 58 per cent of the week's receipts remained?

4. A dressmaker's profits for ten months of one year were $1,650, but during the two months' dull season she lost $231. What was the gain per cent for the year if her receipts were $3,547.50?

5. A dressmaker's receipts one week were $127.50. Of this amount 33⅓ per cent was paid to her assistants and 10 per cent for rent. How much remained? How much of this do you think should be added to her working capital?

6. The next week she sent out $150 worth of work, but two customers—one owing $37.50 and another owing $42.50—failed to pay their bills promptly. Her expenses for the week were $80. What per cent of the week's expenses did she have to draw from her working capital?

7. A dressmaker made a wedding dress for $156 and gave the purchaser 5 per cent discount for prompt payment. What was the dressmaker's profit if the materials for the dress cost $75.25 and the expense of making was $25.60?

Things to Find Out.

1. What is meant by " week's receipts "?
2. What is meant by " working capital "?

SHORT METHODS.

Oral Exercise.

Find the cost of the following:

(Answers to be given at sight.)

1. 24 yd. of lawn at 33⅓¢.
2. 24 yd. of torchon lace at 12½¢.
3. 12½ yd. flannel at 48¢.
4. 54 yd. of percaline at 16⅔¢.
5. 25 yd. of percale at 12½¢.
6. 50 yd. of summer silk at 62½¢.
7. 60 yd. of Rajah silk at 75¢.
8. 87½ yd. of pongee silk at 80¢.
9. 50 yd. of chiffon at $1.25.
10. 25 yd. of lansdown at $1.20.
11. 48 yd. of organdie at 62½¢.
12. 12½ yd. of chambray at 16¢.
13. 33 yd. of challie at 33⅓¢.
14. 30 yd. of Scotch gingham at 83⅓¢.
15. 15 yd. of batiste at 33⅓¢.
16. 24 yd. of featherbone at 8⅓¢.
17. 16 yd. of Cluny lace at 25¢.
18. 18 yd. of Baby Irish lace at 50¢.
19. 20 yd. of Honiton lace at $1.25.

20. 18½ yd. of embroidery at 30¢.
21. 7½ yd. of embroidery beading at 15¢.
22. 12 doz. of pearl buttons at 15¢.
23. 1 doz. cards of hooks and eyes at 15¢ a card.
24. 1 doz. papers of invisible eyes at 8¢ a paper.
25. 2 doz. spools of thread at 4½¢ a spool.

Oral Exercise.

Find the cost of the following:
(Give approximate answers first, then accurate answers and compare.)

1. 2½ yd. of silk at $1.50.
2. 3¾ yd. of percaline at 25¢.
3. 4½ yd. Persian lawn at 30¢.
4. 16½ yd. of cheesecloth at 6¢.
5. 12½ yd. of long cloth at 10¢.
6. 22 yd. of cambric at 15¢.
7. 3¾ yd. of linen at 60¢.
8. 8½ yd. of gingham at 25¢.
9. 15 yd. of outing flannel at 15¢.
10. 20 yd. of drilling at 12½¢.
11. 13 yd. of taffeta at 90¢.
12. 16 yd. of nainsook at 16¾¢.
13. 24 yd. of Valenciennes lace at 12½¢.
14. 10 yd. of chambray at 16¾¢.
15. 20 yd. of cashmere at 75¢.
16. 10 yd. of Henrietta cloth at $1.10.
17. 11 yd. of nun's veiling at 65¢.

18. 12½ yd. of challie at 50¢.
19. 37½ yd. of crinoline at 10¢.
20. 25 yd. of muslin at 10½¢.
21. 11½ yd. of unbleached muslin at 7¢.
22. 5 yd. of organdie at 62½¢.
23. 8¼ yd. of dimity at 25¢.
24. 10¼ yd. of marquisette at $1.20.
25. 15 yd. of cotton poplin at 19¢.

IV

BUYING AND SELLING.

1. Find the cost of 128 yards of serge at 87½¢ a yard, and 248 yards of lawn at 12½¢ a yard.

2. At $1.12½ a yard, what is the cost of 15⅜ yards of velvet?

3. A piece of lace insertion containing 36 yards cost $1.62. What was the cost per yard? It was sold at 7½¢ a yard. What was the gain on the piece?

4. White linen braid was bought at 60¢ a dozen pieces and sold at 8¢ each. What was the gain on 6 dozen pieces?

5. A merchant bought 6 pieces of cotton poplin of 40 yards each, at 16⅜¢ a yard. He sold ¾ of it at 25¢ a yard and the remainder he closed out at 19¢ a yard. What was the gain on the 6 pieces?

6. A merchant bought two pieces of white lawn for $7.36¼, one piece containing 37½ yards and the other 40 yards. Find the cost of 1 yard.

7. At 15¢ a dozen, how many gross of buttons can be bought for $18?

8. Stockings that were marked 35¢ a pair were sold 3 pairs for $1. How much did a customer save who bought 1 dozen pairs?

9. A 36-yard piece of lawn cost a merchant $4.50. He sold it for $2.16 more than he paid for it. What was the selling price of 1 yard?

10. A merchant bought 6 pieces of lawn: 2 pieces of 30½ yards each, 2 pieces of 34½ yards each, and 2 pieces of 40¼ yards each. How many yards did he buy? At 8⅓¢ a yard, what was the cost of the lawn?

11. From a 40-yard piece of chambray, a merchant sold 6½ yards to one customer, 12½ yards to another, and 17¼ yards to another customer. How many yards remained in the piece?

12. A merchant bought a 40-yard piece of chambray at 8⅛¢ a yard, 36 yards of lawn at 7½¢ a yard, and 30 yards of drilling at 10½¢ a yard. What was the amount of his bill?

13. Fancy batiste that sold for 30¢ a yard was reduced 20 per cent at the close of the season. What did the merchant receive for 12½ yards?

14. Hooks and eyes that cost 30¢ a dozen cards were sold at 5¢ a card. What was the gain per cent?

15. Buttons that cost $2 a gross were sold at 25¢ a dozen. What was the gain per cent?

16. A merchant paid $1.80 a dozen pairs for dress shields and sold them at 25¢ a pair. What was his gain per cent?

17. Outing flannel costs $2.34 for 36 yards. For how much must it be sold to gain 2½¢ per yard?

18. A merchant bought a job lot of lace for $6. He

sold 30 yards at 12½¢ a yard, 15 yards at 20¢ a yard, and the remaining 20 yards at 10¢. What per cent did he gain?

19. A merchant paid $36 for 144 yards of organdie and sold it at 39¢ a yard. What per cent did he gain?

20. Cretonne that cost 26¼¢ a yard was sold for 33⅓ per cent more than it cost. What was the merchant's gain on 50 yards of cretonne?

21. A merchant bought 350 yards of muslin for $28 and received 5 per cent discount for cash. He sold the muslin at 10¢ a yard. What was his gain per cent?

22. A merchant bought 12 yards of appliqué trimming for $15 and sold it for 98¢ a yard. What was his loss per cent?

23. Two pieces of lawn of 40 yards each cost a merchant $6.40. He sold one piece at 18¢ a yard and the other at 12½¢ a yard. Did he gain or lose? What per cent?

V

FACTORY SEWING.

1

What the Workers Earn.

1. A straw sewer is paid 20¢ each for making hats of patent Milan. How many hats must she average per day to earn $36 a week?

2. She is paid 23¢ each for making hats of the finest grade Milan, and averages 2 dozen per day during the month of January. What are her earnings for the month? (Use the calendar.)

3. A less skilled worker received $19.44 one week for making hats of coarse braid. How many hats did she make if she was paid 72¢ a dozen?

4. For sewing Canton braid a straw sewer is paid 6½¢ for each hat. How many dozen hats must she make to earn $15.60 a week?

5. For children's hats made of very coarse braid a straw sewer is paid 24¢ a dozen and makes 20 dozen a day during the busy season. How many hats does

SEWING STRAW HATS.

she make in one week? What are her week's earn-
ings?

6. A straw sewer averaged $25 a week during Jan-
uary, February, March, and April, and $16 a week
during the next 3 months. What were her average
weekly earnings for the straw-sewing season? (Use
4 weeks to the month.) If she was idle the remainder
of the year, what were her average weekly earnings
for the year?

7. A skilled straw sewer averaged $19.64 a week
for 46 weeks in the year in one factory. She was of-
fered $45 a week in another factory, but found she
would have work only 10 weeks in the year. Which
was the better position?

8. A man is paid $2 per hundred for hot-blocking
hats. How many hats must he block in one week to
earn $42.50?

9. These hats (see previous problem) are later
passed on to the hydraulic press, where the operator
is paid $1.70 per hundred for pressing them. What
are his week's earnings?

10. In a hat factory 20 women sew on crowns and
put in linings at 85¢ per dozen hats. What are the
average earnings when the weekly output is 3,600
hats?

11. In the same factory 2 men varnish these (see
previous problem) hats at 7½¢ per dozen. What are
the average earnings of the varnishers?

A HOT BLOCK FOR BLOCKING STRAW AND FELT
HATS.

Things to Find Out.

1. What is Milan braid?

2. What is meant by hydraulic?

3. Why are these hats varnished?

4. Mention some things included in running expenses.

5. What is meant by " plant depreciation "?

Milan Hats—From Factory to Consumer.

1. Milan hats are put through eight processes before they are ready for the market. From the following schedule find the cost of the labor on 1 dozen hats:

Sewing the braid into hat shape...... $0.23 per hat
Sizing .... .50 " doz.
Hot-blocking .... 2.00 " 100
Steaming .... .70 " "
Hydraulic pressing .... 1.70 " "
Wiring by machine .... .05 " doz.
Varnishing .... .07½ " "
Sewing on crowns and lining by hand .85 " "

2. These hats are made of 2 pieces of best Milan braid at 60¢ a piece. What is the cost of the materials for 1 hat, including 1¾¢ for wire?

3. The cost of the labor on 1 dozen hats is what per cent of the cost of the materials for 1 dozen hats?

4. To the cost of labor and materials for 1 dozen hats add $1.20 per dozen for the cost of packing and casing, and find the manufacturer's cost for 1 dozen hats.

5. These hats are sold to dealers for $36 a dozen, with 6 per cent discount for cash. What does the manufacturer receive for 1 dozen hats? What is his profit?

6. This is not a net profit, however; 35 per cent of it must be deducted for running expenses and plant depreciation. What is the manufacturer's net gain? How many dozens of these hats must he sell to realize $1,164.24?

7. A retail dealer buys these Milan hats at $36 a dozen, with 6 per cent discount, and sells them at $5 each. What is his gain per cent? Is this a net gain? Why?

2

THE MANUFACTURE OF WOMEN'S SUITS.

What the Workers Earn.

1. During the 6 weeks' busy season in a New York suit factory, 5 men operators make linen skirts at 40¢ each. What does an average worker earn when the weekly output is 500 skirts? What does each man earn during the busy season?

2. After the 6 weeks' season the weekly output

is only 300 skirts. What does an average skirt oper-
ator earn during 10 weeks' slack season? What does
he average per week for the entire linen season?

3. In the same factory 15 men operators make
linen coats at 60¢ each. What does the average op-
erator earn when the weekly output is 500 coats?
What does each man earn during the 6 weeks' busy
season?   •

4. During the remaining 10 weeks of the linen
season in this factory the weekly output is only 300
coats. What does the average coat operator earn dur-
ing the slack season? What does he average per week
for the linen season?

5. For making cloth skirts 5 men operators are
paid 75¢ for each skirt. What does the average
worker earn when the weekly output is 300 skirts?
What does he earn during the 5 weeks' busy
season?

6. During the remaining 22 weeks' slack season
the weekly output averages only 140 skirts, but the
style has changed and the 5 operators average $1 for
each skirt made. What does an operator earn dur-
ing the cloth season? From problems 1, 2, 5, and 6
find average weekly wages for the year.

7. In the same factory 8 women are paid 25¢ each
for finishing linen coats during the 6 weeks' busy
season. What does an average worker earn when the
weekly output is 500 coats?

ELECTRIC POWER FACTORY MACHINES.

8. During the 10 weeks' slack season, when the weekly output averages only 300 coats, what does each of the 8 finishers earn per week? What are the average earnings for a finisher for the linen season?

9. For finishing cloth coats 8 women are paid 55¢ each. What does the average worker earn during the 5 weeks' cloth season, when the weekly output averages 300 coats?

10. What does each of the 8 finishers earn during the slack season of 22 weeks, when the weekly output averages 140 coats, if they are paid 95¢ for each coat? From problems 7, 8, 9 and 10 find the average weekly earnings of a finisher for the year.

11. A man is paid 85¢ per 100 for making machine buttonholes in women's coats. How much does he get for the buttonholes on 500 coats, each coat having 4 buttonholes? He does this work in 2 days of 10 hours each; what does he average per hour for the work?

12. A presser is paid 30¢ each for pressing linen suits; how many suits must he press to earn $18 a week? How many woolen suits at 60¢ each must he press to earn $21.60 a week?

13. For a weekly output of 500 coats, 25 men are paid $597 for their work and 8 women $125 for their work. What is the average per capita for the men? For the women? Suggest some reasons for this difference.

Things to Find Out.

1. What is the operator's work?
2. What is the finisher's work?
3. What is meant by " weekly output "?
4. What is meant by " per capita "?
5. Why are the busy seasons so short?

Problems on the Cost and Sale of Women's Suits.

1. A manufacturer of women's suits bought 900 yards of linen suiting for $94.50 and made it into suits of 9 yards each. What was the cost of the materials for each suit, including $9\frac{1}{2}\cent$ for findings?

2. The cost of the materials for 1 suit was $66\frac{2}{3}$ per cent of the cost of the labor on 1 suit. What was the cost of the labor on 1 suit?

3. To the cost of the material and the cost of the labor on 1 suit the manufacturer added 50 per cent for expense of manufacturing and selling. What was the total cost of 1 suit?

4. These suits were sold to retail dealers at $4.25 each. What was the manufacturer's gain per cent? How many suits must he sell to make $875 profit?

5. He sold 4 dozen of these suits to a jobber for $192. What did the jobber pay for 1 suit? The jobber's cost is what per cent of the retail dealer's cost?

6. The same manufacturer makes cloth suits also. Find the total cost of the following suit if 50 per cent

of the cost of materials is added for cost of manu-
facturing and selling:

 6¼ yards cloth, at................$0.95
 Cutting .... .50
 Operating 1.95
 Finishing .... .75
 Pressing .... .60
 Buttonholes .... .10
 Findings .... .25
 Buttons .... .35

7. These cloth suits are sold to jobbers in lots of
50 for $710 and to retail dealers at $16 each. The
jobber's cost is what per cent of the retail dealer's
cost?

8. A retail dealer bought 2 dozen linen coat suits
at $4.25 each. He sold ⅔ of them at a profit of 60 per
cent and closed out the others at the end of the season
for 20 per cent less than cost. What was his gain per
cent on the suits?

3

INFANTS' DRESSES.

1. For making infants' dresses of a certain style an
operator is paid $2.75 a dozen. How many dresses
must she average per day to earn $15.13 a week?

2. For another style the manufacturer pays $1.35

a dozen. The average worker makes 1½ dozen per day. What are her week's earnings?

3. A manufacturer of infants' dresses bought 100 yards of lingerie batiste for $12.50, 100 yards of lace for $3.50, and 50 yards of embroidery for $6.50. He received 2 per cent discount on the batiste and 7 per cent discount on the lace and embroidery. What did he pay for materials?

4. In estimating the cost of 1 dozen infants' dresses it was found that $1.54, the cost of labor, was 22 per cent of the total cost. What was the total cost of 1 dozen dresses?

5. For these dresses 17 yards of lawn at $5\frac{5}{17}\cancel{c}$, 1 dozen embroidered yokes for 39¢, 3 pieces insertion at 18¢, and 3 pieces of lace at 12¢ were used. What was the cost of the materials if the manufacturer received a discount of 2 per cent on the lawn and 7 per cent on the embroidery and lace?

6. The cost of the materials for 1 dozen dresses was $2.11 and the cost of the labor $1.54. What per cent of the total cost was used for other expenses, the total cost of 1 dozen dresses being $7?

7. These dresses are sold to retail dealers for $12 a dozen, with 9 per cent discount for cash. What per cent profit does the manufacturer make? What per cent profit does the retail dealer make when the dresses are sold at $1.49 each? Is the retail dealer's gain a clear gain? Why?

4

FACTORY-MADE SHIRT-WAISTS.

1. In a shirt-waist factory the operators average 2 dozen waists daily. What is the weekly output when 80 operators are employed?

2. Three buttonhole workers are paid 6½¢ a hundred for making machine buttonholes in these waists. What is the average weekly wage when there are 4 buttonholes to the waist?

3. The finishers sew buttons on shirt-waists at the rate of 6¢ for 6 dozen buttons. How many dozen waists, 4 buttons to the waist, must a finisher average daily to earn $6 a week?

4. Examiners are paid $7 a week for looking over the waists before they are given to the presser. How many examiners, averaging 30 dozen waists a day, are needed in a factory having a weekly output of 6,480 waists? What are their combined weekly earnings?

5. How many expert pressers, averaging 10 dozen shirt-waists a day, are needed for a factory having a weekly output of 5,760 shirt-waists? What does each worker earn when she is paid 18¢ a dozen waists?

6. In a factory where 18 finishers are employed, their combined wages for one week were $171. What was the average wage?

7. In the same factory 80 operators earned $640

in one week. An operator's wage was what per cent of a finisher's wage?

8. In the shirt-waist trade the busy seasons are from January 1st to July 1st, and from August 15th to November 15th—use the calendar. How much does a cutter earn who averages $20 a week during busy seasons? What is his average weekly wage for the year when he is idle between seasons?

9. How much does a presser earn during the busy seasons (see previous problem), when her earnings average $9.50 a week?

10. In a certain factory 9 women drapers earn $121.50 weekly during the busy season (see problem 8). What is the average weekly wage of the draper who is idle the remainder of the year?

11. For a waist which retails at $3.75 the workers who made the waist are paid 20¢ for their combined labor. What per cent of the cost does the buyer pay for the making of the waist? Why is so little paid for the work?

Things to Find Out.

1. What parts of the waist do the operators make?
2. What is the finisher's work?
3. What is the examiner's work?
4. What is a draper's work?
5. What part of the work of making a shirt-waist is the most skilled?

5

SWEATSHOP WORK.

1. A worker is paid 12½¢ each for the following work on children's coats: lining, hemming, putting on the collar, putting in the sleeves, and putting on medallions, braid, and cuffs. If she makes 6 coats a day, what are her day's wages? Her week's wages?

2. Bead necklaces having 61 beads of different sizes are strung and clasp attached for 30¢ a dozen necklaces. Working 12 to 14 hours a day, a worker earns 45¢. How many necklaces does she make in a day?

3. For trimming a certain kind of embroidery edging, a worker is paid 20¢ per 100 yards. What is the price per yard? How many yards must a worker trim to earn $4.50 a week?

4. A worker is paid 25¢ a dozen for featherstitching and putting French knots in infants' dresses. She can do the work on one dozen dresses in 36 hours, working 14 hours a day. What are her earnings for 1 hour? For 1 day?

5. For men's neckties workers are paid 55¢ a dozen for lining and hand-sewing. If the average wage is $4 a week, how many dozen per week does the average worker finish?

6. Chiffon appliqué is trimmed by hand before it is ready for sale. For this a worker is paid 6¢ a yard. She cuts on the average ⅝ of a yard per hour. What

are her earnings for an hour? For a day, if she works 10 hours a day? For a month (4 weeks), when she pays 20¢ a month for having her scissors sharpened, what are her net earnings?

7. For a certain kind of violets a dealer pays 3¢ a gross. A mother and her children, who work after school until 8 or 9 o'clock, make 15 gross a day. What do they earn in a day? A week?

8. Small white flowers are worth 6¢ a gross, and from 10 to 12 gross a day are made by the mother with the help of her children, who work after school and Saturday until 10 or 11 P.M. What are their day's earnings?

9. Holly is worth $1.25 for a gross of sprays. There are 14 leaves and 14 berries on one spray, and 3 persons, working 11 hours, make ½ gross of sprays. How many did each worker make? What was each one's share of the earnings?

10. Another variety of flowers pays 6¢ a gross. Two persons in 1 week earned $1.13. What did each one earn in a week? In 1 day? How many gross of flowers did they make?

Things to Find Out.

1. What is a sweatshop?

2. Where is much of the sweatshop work done? Why?

3. Why has New York City so many sweatshops?

VI

SAMPLE MOUNTING AND NOVELTY WORK.

1

GENERAL DIRECTIONS FOR SAMPLE CARDS.

For four- to six-sided samples:

Side margins and spaces (from top to bottom of the card) between the rows of samples should be the same
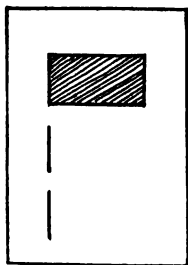
MOUNTING OF FOUR-SIDED SAMPLES.

width. The top margin should be wider than the bottom margin. The spaces between the samples *in*

the rows should ordinarily be narrower than the spaces
between the rows.

For triangular samples:

Triangular samples are placed in rows lengthwise
of the card, samples touching each other. The spaces
between the rows should be the same width as the side
margins.
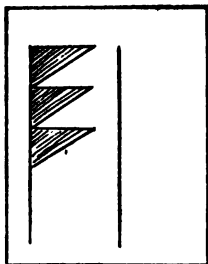
MOUNTING OF TRIANGULAR SAMPLES.

For Strap and Braid cards:

For strap cards the samples are doubled on the
width and are overlapped $\frac{1}{4}$ of an inch to $\frac{3}{8}$ of an inch
in mounting. The top margin should be wider than
the bottom margin. Side margins of strap cards
should be the same width. Braid cards have no side
margins.

An illustrative problem. Find the width of the margins and spaces for a sample card 6 inches by 9 inches, having 4 rectangular samples 3 inches wide by 1¼ inches long.

6	inches =	width of card.
3	" =	width of sample.
—		
3	"	left for side margins.
½ of 3	"	= 1½ inches width of each side margin.
9	"	= length of card.
4 × 1¼ inches, or 5	"	= the length of 4 samples.
—		
4	"	left for top and bottom margins and spaces.
½	"	= width of each space.
1½	"	= width of top margin.
1	"	= width of bottom margin.

The spaces in the rows must be in correct propor-tion to the size of the samples, the size of the card, and the width of the margins, hence the worker must divide the number of inches left for margins and spaces into such parts as will give the finished card a pleasing appearance. This requires judgment and some familiarity with sample cards. The diagram on p. 71 shows the proportions commonly used.

MOUNTING OF SAMPLES.

Flat-card Work.

1. Cut a sample card $4\frac{1}{2}''$ by $4\frac{1}{2}''$ and prepare it for 1 rectangular sample $2\frac{1}{2}''$ wide by $1\frac{3}{4}''$ long.

2. Find the width of the margins and spaces for a sample card $5\frac{1}{2}''$ by $8''$, having 3 rectangular samples $3\frac{1}{4}''$ wide by $1\frac{1}{2}''$ long. Prepare the card for the samples.

3. Find the width of the margins and spaces for a sample card $6\frac{1}{4}''$ by $8''$, having 10 triangular samples (2 rows) $2''$ wide by $1\frac{1}{4}''$ long. Prepare the card for the samples.

4. Find the width of the margins and spaces for a sample card $5\frac{1}{2}''$ by $8''$, having 8 hexagonal samples (2 rows) $2''$ wide by $1\frac{1}{2}''$ long. Prepare the card for the samples.

5. Find the width of the margins and spaces for a sample card $8''$ by $10''$, having 18 rectangular samples (3 rows) $2''$ wide by $\frac{7}{8}''$ long. Prepare the card for the samples.

6. How many rectangular samples $2\frac{1}{2}''$ wide by $1\frac{1}{2}''$ long can be mounted on a sample card $5\frac{1}{2}''$ by $8''$, with allowance for proper margins and spaces?

7. How many triangular samples $2''$ wide by $1\frac{1}{4}''$ long can be mounted on a sample card $4''$ by $7''$, with allowance for margins?

8. How many hexagonal samples $2''$ wide by $1\frac{3}{4}''$ long can be mounted on a card $7\frac{1}{2}''$ by $10\frac{3}{4}''$, with allowance for margins and spaces?

Strap Cards and Braid Cards—Written Exercise.

1. Find the margins for a strap card $4\frac{1}{2}''$ by $8''$, having 10 samples $2\frac{3}{4}''$ wide by $2''$ long. (Lap the samples $\frac{3}{8}$ of an inch.) Prepare the card for the samples.

2. How many samples $2\frac{1}{2}''$ wide by $2''$ long can be mounted on a strap card $4''$ by $8''$, allowing $\frac{1}{4}$ of an inch for lapping?

3. Find the width of margins and spaces for a braid card $5\frac{1}{2}''$ by $9''$, having 10 samples of half-inch silk braid. (No side margins on braid cards.) Prepare the card for the samples.

4. How many samples of braid $\frac{3}{8}$ of an inch wide can be mounted on a card $5\frac{1}{2}''$ by $9''$? What are the margins and spaces?

5. How many yards of braid will be required for 10 samples $6\frac{1}{2}''$ long? If the braid is worth 18¢ a yard, what will the braid for 1,000 samples cost?

2

SAMPLE CUTTING.

In cutting samples of cotton, wool, silk, or linen cloth, the width of the sample must be cut on the width of the material and the length of the sample on the length of the material.

Illustrative problem. How many rectangular samples 3″ wide by 1¾″ long can be cut from ⅔ of a yard of silk 19 inches wide?

19 in.

⅔ of a yard.
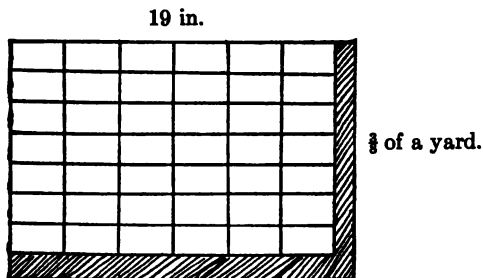
19 ÷ 3 = 6(⅓) on the width. The fraction cannot be used.

13½ ÷ 1¾ = 7(⁴⁄₇) on the length. The fraction cannot be used.

7 × 6 = 42   samples.

Oral Exercise.

1. How many samples 2″ by 2″ can be cut from a piece of lawn 30 inches long and 30 inches wide?

2. How many rectangular samples 2″ wide by 1″ long can be cut from a piece of lawn 1 yard long and 36 inches wide?

3. How many rectangular samples 3″ wide by 2″ long can be cut from 1 yard of 27-inch lawn?

4. How many braid samples 6″ long can be cut from 3 yards of braid?

5. From a piece of lace 2 yards long, how many lace samples 3″ long can be cut?

Written Exercise.

1. How many rectangular samples 2″ wide by 1⅛″ long can be cut from 2 yards of yard-wide percale?

2. How many rectangular samples 2¼″ wide by 1¾″ long can be cut from 1½ yards of 30-inch lawn?

3. How many triangular samples 2¼″ wide by 1⅜″ long can be cut from 2¼ yards of 28-inch madras?

4. How many yards of 36-inch lawn are required for 576 rectangular samples 2¼″ wide by 1¼″ long?

5. How many yards of 30-inch lawn are required for 1,344 triangular samples 2⅛″ wide by 1¼″ long?

6. The lawn in problem 5 cost the merchant 15¢ a yard, 100 cards for the samples cost 5¢, and the mounting of the 1,344 samples 50¢ per thousand; what was the total cost of the samples?

7. Take a piece of lawn having a large design and plan the samples to be cut from it. Is there any waste? How does waste affect the number and cost of samples? Estimate the cost of the samples.

3

CUTTING OF BOX FOUNDATIONS.

Oral Exercise.

1. How many pieces 2″ by 2″ can be cut from a piece of pulp board 12″ by 12″?

2. How many 3″ by 4″ pieces can be cut from a piece of pulp board 12″ by 12″?

3. How many 3″ by 4″ pieces can be cut from a piece of pulp board 18″ by 24″?

4. How many pieces $2\frac{1}{2}$″ by 3″ can be cut from a piece of pulp board 25″ by 30″?

5. How many pieces $2\frac{1}{2}$″ by 3″ can be cut from a piece of pulp board 26″ by 32″?

Written Exercise.

1. How many 5″ by 5″ box bottoms can be cut from 1 sheet of pulp board 26″ by 38″? How much is wasted?

2. How many sides $5\frac{1}{8}$″ by 2″ can be cut from 1 sheet of pulp board 26″ by 38″? How many boxes can be made from this number of sides? How many boxes (without covers) can be made from 2 sheets of pulp board 26″ by 38″ by cutting 1 sheet into bottoms and the other into sides? What is the average number of boxes per sheet? How many pieces are left over?

3. How many 5″ by 5″ by 2″ boxes (without covers) can be cut from 1 sheet of pulp board 26″ by 38″?

4. Cut 5″ by 5″ by 2″ boxes the two ways indicated in problems 1, 2, and 3, and compare. Which is the better plan?

5. How many 6″ by 6″ by 2½″ boxes (without covers) can be cut from 1 sheet of pulp board 26″ by 38″? Solve in the two ways indicated for the 5″ by 5″ by 2″ boxes. Which is the better plan?

6. How many 4″ by 14″ by 2½″ glove boxes (without covers) can be cut from 1 sheet of pulp board 26″ by 38″? Solve in two ways.

7. From 1 sheet of binder's board 22″ by 28″, how many covers 5¼″ by 5¼″ can be cut? What is the cost of 1 cover if binder's board cost $1.25 per 1½ dozen sheets?

8. How many glove-box covers 4¼″ by 14¼″ can be cut from 1 sheet of binder's board 22″ by 28″? How can the waste be used?

9. How many box covers 8¼″ by 10¼″ can be cut from 1 sheet of binder's board 22″ by 28″? How many sheets of binder's board are needed for 1 dozen covers?

4

SAMPLE MOUNTING.

Oral Exercise.

1. If a girl mounted 500 samples in 1 day, how many should she mount in 1 week?

2. A girl earned $2 in 3 days; how much should she earn in 2 weeks?

3. A manufacturer pays 20¢ a thousand for mounting samples; how much does a girl receive for 1,250 samples? For 3,500 samples?

4. Mary mounted 100 samples an hour. How many did she mount in a week, if she worked 9 hours a day?

5. When there are 24 samples on one sample card, how many samples are there on 2½ dozen cards?

6. A girl is paid 50¢ per thousand for mounting samples; how many thousand must she mount to earn $6?

7. There are 27 lace samples in 1 book. How many lace samples in 200 books?

8. In an order for 200 sample books, Mary mounted half the samples. How many samples did she mount if there were 30 samples in each book?

9. There are 38 samples on 1 card. How many samples in an order for 200 cards?

10. When there are 330 '' half-pasted '' samples in 1 sample book, how many samples are there in 1 dozen books?

11. A girl is paid 1½¢ for mounting 38 samples on 1 card. How many cards must she make to earn $1.50 a day?

12. How many samples in an order for 1 dozen sample books, 340 samples to the book?

13. A girl mounted 5,292 samples one week. How many did she average per day?

14. When there are 10 samples to a page and 10 pages to a book, how· many samples in an order for 10 dozen books?

15. At 14¢ a book, how many books must a sample mounter average per day to earn $6.30 a week?

16. A manufacturer pays 14¢ for 330 tailor's samples. How much does he pay for 990 tailor's samples?

Written Exercise.

1. A flat-card worker mounts 24 samples on one card, and finishes 50 cards in one day. At this rate, how many samples can she mount in a week of 6 days? If she is paid 2¢ per card, what are her week's wages?

2. If a girl can mount 800 samples a day working 5 hours, how many samples can she mount in 2 hours?

3. A girl mounts 38 samples on one card. She is paid $1\frac{1}{2}$¢ a card and earns $6.93 a week. How many cards per week does she mount? How many samples does she mount per day?

4. If a girl can mount 840 samples a day, working 8 hours, how many days will it take her to mount 4,800 samples, working at the same rate? What per cent does she mount in 1 hour?

5. How many books of 16 pages each, 10 samples to the page, can a girl mount in 6 days of 8 hours each, if she mounts 160 samples an hour?

6. In woolen sample-mounting a girl is obliged to earn $6 a week. She is paid 50¢ per thousand for mounting samples. How many does she mount in 1 day?

7. Flat-card mounters of woolen goods earn 50¢ for mounting 1,000 samples on 1,000 cards. They must mount 2,000 samples per day to hold their positions. How many samples are mounted per week? How much does each worker earn?

8. A worker is paid 30¢ per hundred for sample book covers and 20¢ per hundred for lining them. She earns $6.50 per week. How many covers does she average per day?

9. A sample mounter is paid $1 per thousand for mounting cotton suspender samples. When there are 8 samples on each card, how many cards must she mount to earn $6.50 a week?

10. At $1 per thousand samples, what should a manufacturer pay for 1,200 cards of suspender samples, 12 samples to each card?

11. Silk suspender samples are mounted 3 samples on a card, and cost the manufacturer $1.25 per thousand samples. What should he pay for 600 cards?

12. A manufacturer pays $3.50 per thousand for

mounting lace samples. When there are 5 samples on a card, how many cards must a girl finish to earn $5.25 a week?

13. At 1¾¢ per card, what will the mounting of 6,250 lace samples cost when there are 5 samples on each card?

14. There are 340 '' half-pasted '' tailor's samples in a book of 12 pages. For this work a girl is paid 15¢ per book. How many books must she make to earn $6 a week? How many samples does she average per hour if she works 9 hours a day?

15. A sample mounter is paid 14¢ per book for tailor's samples, each book containing 330 samples. How many tailor's samples must she mount to earn $7.98 a week? How many per day?

16. A sample mounter is paid 90¢ per hundred cards for mounting mat cards in a book of 6 pages, 1 mat card to the page. What is the cost of 30 books? Of 6¼ doz. books.

17. The school has an order for 4,321 books at 1¼¢ each. There are 20 samples in each book. How many in the whole order? How much does the school receive for the books?

Things to Find Out.

1. What is flat-card work?

2. What are '' half-pasted '' samples?

5

NOVELTY SUPPLIES.

Oral Exercise.

1. What is the cost of 150 memorandum pads, at $3.20 per hundred?

2. Find the cost of 1 memorandum pad, at 80¢ per 100 pads.

3. At $3.20 per hundred pads, what is the cost of 250 pads?

4. At 37½¢ a dozen, what is the cost of 60 brass handles?

5. One gross of brass fasteners costs 62½¢. What is the cost of 24 dozen?

6. Brass fasteners cost 75¢ a gross. What is the cost of a half dozen?

7. Silk tassels cost ½¢ each. How many can be bought for $2.50?

8. When 80 sheets of pulp board cost $1.25, what does 1 sheet cost?

9. When 40 sheets of pulp board cost $1.25, what do 80 sheets cost?

10. At 87½¢ a yard, what is the cost of 40 yards of French chintz?

11. If ¾ of a yard of binder's muslin will make 4 braid card covers, how many covers of the same size can be made from 9 yards of binder's muslin?

12. Grass cloth costs 60¢ a yard when bought in a

small quantity, but when bought by the piece it costs 50¢ a yard. How much is gained by buying a piece of 8 yards?

13. At 16¢ a yard, how many yards of pebble muslin can be bought for $9.68?

14. Find the cost of 10½ yards of leatherette at 34¢ a yard, and 4 yards of binder's muslin at 12¢ a yard.

Written Exercise.

1. How many bundles in 1 ton (2,000 pounds) of pulp board when 1 bundle weighs 50 pounds? When a ton costs $50, what is the cost of 1 bundle?

2. When bought in small lots, 1 bundle cost $1.50. How much is saved on a half-ton of pulp board bought at the ton rate? What is the per cent profit?

3. What is the cost of the binder's muslin for 5 dozen small sample book covers, if 10 covers can be made from ¼ of a yard of 15¢ muslin?

4. When ¾ of a yard of pebble muslin will make 4 braid card covers, how many covers can be made from a piece of pebble muslin 2½ yards long? What is the cost of 1 cover when pebble muslin costs 16¢ a yard?

5. Leatherette costs 34¢ a yard, and ¾ of a yard will make 3 braid card covers. What is the cost of the leatherette for ¾ of a dozen covers?

6. What does the binder's muslin for an order for 75 small sample book covers cost at 15¢ a yard, when 10 covers can be cut from ¼ of a yard of binder's mus-

lin ? In filling this order, we were obliged to use 18¢
binder's muslin. What was the difference in cost ?
What per cent did we lose by the change ?

7. Dennison handy boxes were bought at $3.30 per
½ dozen, covered with fancy cretonne, and sold at
$1 each. If the gain on the transaction was 33⅓%, how
much was spent for materials ?

8. The materials used for a cretonne-covered waste
basket were as follows:

> 1 yard cretonne, at.............. .25
> 2 sheets folding card paper, at... .01¾
> 4 yards ribbon, at............... .08
> 1 yard kid paper lining, at...... .05

Find the cost. It was sold for $1.50, which was at
a gain of 33⅓ per cent. What did the worker receive
for making the basket ?

9. A dealer in novelty goods bought 200 blank books
for $6.40, and, after putting fancy covers on them,
sold them at 15¢ each. What was his gain per cent ?
Was this a net gain ?

6

HOW SAVING INCREASES PROFITS.

1. Kid paper is 24 inches wide. How many circular
labels 7 inches in diameter can be cut from 1 yard
of kid paper ? The paper costs 5¢ a yard. What is

the cost of 1 dozen labels? If 1 label in every 6 is wasted, what is the loss per cent?

2. In filling an order for 3 glove boxes and 3 stock boxes a girl used 3 yards of cretonne worth 60¢ a yard, and 3 yards of cotton moreen worth 20¢ a yard. The boards for these boxes cost 30¢, and the girl was paid 25¢ each for making them. What was the total cost? The stock boxes were sold for $2 each and the glove boxes for $1.50 each. What was the gain per cent on the boxes?

3. Another girl was given the same amount of the same material as the girl in problem 2. She cut 3 glove boxes, 3 stock boxes, and had enough material left for 2 extra boxes, which were sold at 35¢ each. What was the gain per cent on her order if she was paid 10¢ each for making the extra boxes? How much did her profit exceed the first girl's profit?

4. The order in problem 2 was damaged in shipping and had to be replaced by the factory. In duplicating the order the same cretonne was bought in two remnants; one, containing 2 yards, was bought for 60¢, and another, containing 1 yard, for 30¢. To the cost of the cretonne add 3 yards of lining at 20¢, 30¢ for boards, and 25¢ each for making the 6 boxes, and find the total cost. What was the cost of the 2 sets of boxes? Did the factory gain or lose? What per cent?

5. Suppose the girl in problem 3 had been asked to

re-fill the order with same materials used by the girl
in problem 4. What would have been the rate of gain
or loss?

7

PLANNING WORK AND MAKING ESTIMATES.

1. When a 2¢ sheet of pulp board will make 12
boxes, what is the cost of the board for 1 box? For
100 boxes?

2. A certain girl cut 4 handkerchief boxes from a
sheet of pulp-board. What was the cost of 1 box,
pulp-board being worth 2¢ a sheet? Of 100 boxes?

3. Another girl cut 12 handkerchief boxes of the
same size from 1 sheet of pulp-board. What was
the cost of 1 box, pulp-board being worth 2¢ a sheet?
Of 100 boxes? How much less did these boxes cost
than those in problem 2?

4. A 6″ by 6″ handkerchief box can be made from
¼ of a yard of small-figured or plain material, but
when made from material having a figure to be
considered, ½ of a yard is required. If the ma-
terial cost 37½¢ a yard, how much greater is the gain
on 1 dozen plain boxes if both are sold at the same
price?

5. The cost of cutting and setting up a pulp-board
foundation for a 6″ by 6″ box is 8¢. A girl is paid
18¢ for covering it with ⅓ of a yard of 27¢ cretonne.
What is the total cost of the box, if ⅓ of the cost of

materials is added for overhead profit? For how much must it be sold to gain 33⅓ per cent?

6. A girl is paid $6 a week for making 100 boxes; what is she paid for 1 box? The material for 1 box cost 24¢. When 33⅓% of the cost is added for overhead profit, what is the net cost of 1 box? At what price each must these boxes be sold to gain 25 per cent?

7. In cutting flowered cretonne that cost 25¢ a yard, ¼ yard is lost in placing the pattern. How many yards are lost on an order for 2½ dozen boxes? What is the loss in money? Who bears the loss?

8. No. 0 memorandum pads cost 80¢ per hundred. What is the cost of 1? Pencils used with these pads cost 75¢ a half gross. What is the cost of 1 pencil?

9. When ⅛ of a yard of grass cloth will cover 3 memorandum pads, how many pads can be covered from 1 yard of grass cloth? When grass cloth costs 50¢ a yard, what is the cost of the cover for 1 book?

10. How many 2½″ by 3½″ pieces can be cut from 1 sheet of pulp-board 26″ by 38″? Work in 2 ways.

11. How many memorandum books will they cover if 2 pieces are used for each book? What is the cost of the board for 1 book, when pulp-board is worth 2¢ a sheet?

12. From problems 8, 9, 10 and 11 find the total cost of 50 covered memorandum pads. These pads are sold at 15¢ each; what is the gain per cent, no charge being made for work?

8

PRACTICAL ESTIMATES FOR NOVELTIES.

1. Plan the cutting of the pulp-board for 1 dozen 6" by 6" by 2½" handkerchief boxes and estimate the cost.

2. Plan the cutting of all the materials used for 6 boxes 5" by 5" by 2" and estimate the cost.

3. Plan the cutting of all the materials for a cretonne-covered waste basket and estimate the cost.

4. A special order for a glove box 4" by 14" by 2½" is to be made. Plan the cutting of the materials and estimate the cost.

5. Plan the cutting of the pulp-board and pebble muslin for 1 dozen braid card covers and estimate the cost.

6. Plan the cutting of the pulp-board and grass cloth for covers for 50 memorandum pads, estimate the cost, and make out a requisition for all the materials required.

7. Estimate the amount of pulp-board, grass cloth and braid needed for 1 dozen large letter racks with extensions.

8. Estimate the cost of the letter racks in problem 7, including 20¢ each for the making.

9. Plan the cutting of the binder's board and grass cloth for 1 dozen desk pads. Make out a requisition for the materials, including the braid for trimming.

MAKING LAMP SHADES.

9

FANCY LAMP SHADES.

1. The silk for box-pleated ruchings used for trimming lamp shades is torn in strips lengthwise. How many strips 2 in. wide can be cut from silk 1 yd. wide?

2. Fold two ¾-inch triple box pleats in a 2-inch-wide strip of tissue paper. How many times the width of a pleat are taken up by 1 triple box pleat? (Pleats must touch, but not overlap.)

3. The bottom circumference of a lamp shade is 16 inches, the top circumference is 9 inches. How many yards of 2-inch-wide strips are required for triple box-pleated ruching when 7 times the circumference is allowed for pleating?

4. How many yards of triple box pleating can be made from 5¼ yd. of 2-inch-wide strips?

5. How many yards of 2-inch-wide strips can be cut from 2 yd. of 30-inch-wide silk? How many yards of triple-pleated ruching can be made from these strips?

6. Lamp shades are covered with silk cut in widths from selvage to selvage. By allowing 3 times the circumference for side pleats, how many widths of 30-inch-wide silk are needed to cover a shade 66 inches in circumference? How many yards of silk are needed if the height is 11 inches? (Allow 1 inch for turnings.)

7. How many yards of 30-inch silk are needed for the ruching of the frame in problem 4 if the bottom circumference is 66 inches and the top circumference 21½ inches?

8. Measure a lamp-shade frame and estimate the number of yards of 30-inch silk needed for the covering and ruching.

9. The materials used for a 20-inch Empire lamp shade with collar were as follows:

¾ yd. silk, at.................... $0.90
⅔ yd. filet net, at............... 2.00
2 yd. of 4-in. silk fringe, at...... 1.70
4 yd. lace, at.................... .06
1 frame, at..................... .50
Making 3.00

The shade was sold for $13. What was the gain per cent?

10. For a 22-in. hexagonal lamp shade the following materials were used:

1½ yd. cretonne, at.......... $0.22½
1 yd. silk for lining, at..... .45
5 yd. guimpe, at........... .75 a doz. yd.
2 yd. bead fringe, at........ .45
1 frame.................. .50
Making 1.75

The shade sold for $7. What was the gain per cent?

INCOMES.

1

TRADE INCOMES.

1. A girl earned $6.50 a week and saved 10% of her money. How much had she in the bank at the end of the 48 weeks?

2. A girl earning $6.50 a week spent $8.50 for a hat. What per cent of her week's wages did she spend? Do you approve of high-priced hats?

3. At the rate of $1.50 for two days' work, what should an operator be paid for 30 days' work? If the day is 8 hours long, what does she earn per hour?

4. At 90¢ a day, what can an operator earn during January and February of the present year? What is the greatest number of working days in a year?

5. If an operator·wastes ¼ of an hour each day, how many hours will she waste during 3 weeks of 6 working days each? If she is paid $1 a day and works 8 hours a day, how much has her employer lost by her waste of time? How can she make up lost time?

6. A girl in a factory wasted 10 minutes every day

for a week. If 350 girls in the same factory wasted the same amount of time in a week, how many hours were lost? What was the employer's loss if he paid them at the rate of 10¢ an hour?

7. A girl earned $10.75 a week on Bonnaz embroidery and a plain operator 60% as much. What was the plain operator's wage?

8. A plain operator made 6 dozen shirt-waists one week, and 8 of them were '' seconds ''; what per cent of her week's work was inferior?

9. An operator earned $7.50 weekly and her sister 66⅔% as much. They gave 60% of their earnings toward the family support. How much had each left for her own use?

10. A girl makes machine buttonholes on 60 dozen waists in 1 day and is paid 28¢ for 10 dozen waists. How many buttonholes does she make when there are 4 buttonholes in each waist? What are her day's earnings? How many weeks must she work to earn $403.20?

11. A girl is paid 12¢ for 100 yards of strip tucking. How many hundred yards must she tuck per day to earn $10.80 a week?

12. For tucking net, 20¢ a hundred yards is a good price. How much does a worker receive for 3,700 yards of tucking? How many yards must she tuck to earn $9.50 a week?

13. A skilled straw sewer working in a certain fac-

tory at $20 a week for 46 weeks in the year was offered 125% more per week in another place. She found, however, that the second factory kept its employees only 12 weeks in the year. Which was the better position?

14. A girl earns $5 a week making jewelry cases. What does she earn in a year of 50 weeks? If she works 32 weeks in the year at $7 a week, which is the better position?

15. A girl is paid 8¢ for cutting and setting up a 6″ by 6″ box. If she averages 1¼ doz. boxes a day, what are her week's earnings?

16. Flat-card mounters earn $6 a week, mat-card mounters earn $10 a week. The mat-card mounter's wage is what per cent of the flat-card mounter's wage?

17. A flat-card worker is paid 1¾¢ a card for mounting 5 lace samples on one card. How much does she earn per week if she averages 400 samples per day? At this rate, how many weeks must she work to earn $302.40? This is her income for the year. What is her average wage per month?

18. A milliner's assistant earns 75¢ a day. How much will she earn during February of the present year? How long will it take her to earn $22.50?

19. A milliner's assistant earns $18 a month and spends $16.50. How much does she save in 2½ years? What per cent of her income does she save?

20. A milliner's improver, earning $1.30 a day dur-

ing the month of November (use November of the present year), spent 10¢ a day for carfare, 15¢ a day for luncheon, and gave ½ of the remainder toward the support of the family. How much had she left for her own use?

21. A girl earned $6 a week during her first 24 weeks in trade and put 25¢ in the savings bank each week. At the end of this time her wages were raised 25% and she increased her savings 20%. How much had she in the bank at the end of the year? (Use 50 weeks.) What per cent of her year's earnings had she in the bank at the end of the year?

22. A girl earned $6 a week during her first year in trade. She spent 10¢ a day for carfare, 15¢ a day for luncheon, put 25¢ in the bank each week, and gave $2.75 weekly toward the family support. With the remainder she bought her own clothes, paid her incidental expenses, and had a small sum left for recreation. How much was used for family support and how much had she for clothing, etc., for the year? (Use 50 wk.)* Make out an itemized account for your own clothing for one year, keeping within this amount.

* In class discussions let each girl express her opinions as to kind, quality, price and number of the various garments she needs, and encourage independent decisions in making out the lists. It is not necessary that all spend the same amount.

2

WAGE RECORDS OF SUCCESSFUL TRADE SCHOOL GRADUATES.

1. A millinery girl from a trade school earned $3.50 per week during the first 12 weeks out at trade. During the next year her wages were increased 42$\frac{4}{?}$ per cent, and during the year following they were increased 20 per cent over what she was then earning. At the end of the 27 months, what wages was she earning? Shortly after this report was made, her wages were increased by 33$\frac{1}{3}$ per cent. What was her last wage?

2. In August, 1905, a millinery graduate was paid $4 a week as her first wage. In October, 1905, this was raised to $5, in June, 1906, to $6, and in September, 1907, to $7.50. Each "raise" was what rate per cent of increase upon her first wage?

3. An operating girl who was paid $4.45 per week as her first wage in 1903, had her pay increased by 106 per cent in 1904, and in in 1906 her pay was 233 per cent of her first wage. What did she earn per week in 1904? In 1906?

4. A straw-sewing operator who had learned her trade in nine months, left the trade school in November, 1906, to do piece work in a straw-sewing house. Her first week's wages were $7.60. Three months later she received $20 for her week's straw-sewing.

In May, 1908, she earned $25 in one week. At this date, how long had she been out in trade and what rate had her last wage increased over her first one?

5. A girl who had taken designing and perforating in the trade-art department of the Trade School left in February, 1908. Her first week's wage was $5. Within nine months this wage was increased 60 per cent. In February, 1909, she was "raised" 25 per cent on her last wage, and in May, 1910, she was earning 50 per cent more than in February, 1909. What was her last wage?

6. A girl who had been trained in designing, perforating, and costume sketching began to work at $8 a week. In two years, as costume sketcher and designer for Bonnaz work, she was earning 87½ per cent more than at first. What was her last wage?

———————

7. A dressmaking graduate began work at $5 a week in October, 1905. In January, 1909, she was given $10 a week and lunches. What was the per cent of increase in her wages? (The lunches counted as $1.20.)

8. At the present time this girl is earning $12 a week on dolls' clothes. Counting the lunches in her former place as 20¢ each, how much better is she doing per month in her present place? (Count 4 weeks to the month.)

9. A crippled girl who learned lamp-shade making to use during the dull seasons for dressmaking, reported that she had earned $100.90 in ten weeks at lamp shades. What was her average wage per week?

10. What were her wages the week before Christmas, when she made 3 shades a day at 75¢ each? (Use 6 days.)

11. A graduate from the novelty department is now earning from 9 to 16 dollars a week at piece work. Eighteen months ago, in her first place, she was paid $6 a week. With a present usual wage of at least $10, she has increased her first earnings by what per cent?

12. A sample-mounter leaving the trade school in 1903, earned $3.50 at her first place. At the end of 30 months she was earning $10 per week. Her weekly wage had increased what per cent?

3

WOMEN'S TRADES IN PITTSBURG.

1. Of the 15,651 women workers in the trades in Pittsburg, only $\frac{8}{10}$ per cent of them can be called skilled workers in a true sense. How many of these workers are unskilled?

2. Among the 406 regular workers in the wholesale millinery houses, 56 per cent earn less than $6 a week

and the others earn more than $8 weekly. Give number of workers in each class.

3. Among these wholesale millinery workers there are 95 skilled women workers earning more than $10 weekly. The season for them is from August 1 to December 1st, and again from January 1 to the middle of May. What does an expert milliner earn during the season? (Count $40 per month.)

4. A woman cutter in a Pittsburg garment factory sometimes begins as an assistant on $12 per week. With added responsibility she can work up to 250 per cent of her first wage. What is the maximum wage there for women cutters?

5. At one time an assistant cutter trained in an eastern factory earned $14 a week. Her place was taken by an inexperienced cutter at $7.50 a week. If the speed of her successor was ½ of her own, did the business gain or lose at the end of 4 weeks?

6. In the pressing department of a woolen suit factory the men are paid $16 a week and the women $7. In a year of 52 weeks how much more has the man presser earned?

BILLS AND RECEIPTS.

1

BILLS.

A collection of the various forms of bills, receipts, and papers used for the exchange of money is the best guide for this work.

1. Make out and receipt a bill for a hat which you sold to a customer, using the following items:

25 yd. Braid, at...............	$0.25
¾ yd. Velvet, at...............	2.25
1 Feather....................	15.00
Making of hat...............	6.00

2. Make out a bill including the materials, the trimmings, and the making for a hat which you sold to a customer.

3. Fill, foot, and receipt the following bill for a dress which you have made for a customer:

10 yd. Lawn, at...............	$0.25
24 yd. Lace, at...............	.12½
Findings	1.50
Making	8.00

4. Make out the following bill for a dress which your dressmaker has made for you:

<div style="text-align:center">

15 yd. Silk, at................. $1.25
12 yd. Lining Silk, at...........   .69
Findings 4.00
Making 20.00

</div>

5. M. Field & Co., of Chicago, Ill., sold to A. A. Taylor & Co., of New York, discount 6%:

12 doz. Middy Blouses, at..... $11.40 a doz.
6 doz. Swimming Suits, at.....   9.00 a doz.

Date, fill, and foot the bill.

6. Make out the following bill for goods which The Handy Novelty Co., of New York, sold to the Colonial Novelty Co., of Chicago:

<div style="text-align:center">

5 Desk Sets, at................. $4.50
2 doz. Cretonne Waste Baskets, at   9.00
1 doz. Fancy Boxes, at..........   3.60

</div>

Things to Find Out.

1. What are the essential parts of a bill?

2. Explain the things that are included in each part of a bill.

3. Why is the date of a bill important?

4. Why do some business firms have more than these essential things on their bills?

5. What is the difference between a bill made on ordinary unruled note paper and one made on paper prepared especially for bills?

6. Mention the ways in which bills may be receipted.

7. Has a receipted bill any value?

8. Explain the use of Dr. (debtor) and Cr. (creditor).

9. What is meant by '' fill '' a bill?

10. What is meant by '' foot '' a bill?

2

RECEIPTS.

NEW YORK, (Date).

Received of Sarah B. Sloane, seventy-five dollars ($75) on account. Balance due, $50.

A. M. SMITH & Co..

CHICAGO, Ill., (Date).

Received of Laurence B. Trevor, seventy-eight dollars ($78) in full to date.

MARSHALL & MARSHALL,
Per C. M. A.

The forms above are those commonly used for receipts.

1. James M. Field owed George B. Morton $156.75 and paid $100 to-day. Write the receipt for the person who received the money.

2. Marshall & Marshall owed The Handy Novelty Co. $27 and paid it to-day. Write the receipt.

3. Mrs. Albert Carruthers owed Mme. Louise Ferier $100 and paid ¾ of it to-day. Make out the receipt.

4. Sarah B. Sloane received $125 as part payment of a bill for $200 which she held against Mrs. George Monroe. Write the receipt for this payment.

5. A. M. Smith & Co. paid $78 on a bill for $150 which they owed Stone & Stone. Write the receipt for the person who received the money.

Things to Find Out.

1. What are the essentials of a receipt?

2. Why should a receipt be dated?

3. What is meant by the expressions '' in full '' and '' on account ''?

4. Can they both be used in the same receipt? Why?

5. Why are initials sometimes placed under the signature?

6. Mention the various papers that serve as receipts.

7. What is the value of receipts?

3

WAYS OF REMITTING MONEY.

1. A man in Chicago owes a New York firm $150; name the various ways for sending the money to New York.

2. Which is the safest way?

3. Which is the cheapest way for large sums? For small sums?

4. Which is the quickest way?

5. What are the most convenient ways for sending large sums of money? For small sums of money?

6. Where are these different transactions carried on?

7. What must be done in order to get the cash for these papers which represent money?

PROBLEMS ON TEXTILES.

1

COTTON.

The Cotton Crop.

1. Cotton is now the world's chief vegetable fiber. The annual crop is $7\frac{1}{2}$ billion pounds, $\frac{5}{8}$ of which the United States raises. How many bales are raised annually in the United States? *

2. The " banner " year for cotton production in the United States was 1904, when 13,451,337 bales were ginned. Of this quantity 4,523,208 bales were used in the United States. What per cent of the crop was exported?

3. The number of bales of cotton ginned from the growth of 1907 to January, 1908, was 10,337,607, and this included 80,187 bales of sea-island cotton. What per cent of the crop was sea-island cotton?

4. This year (1910) there is an increase of about 904,000 acres, or 2.8 per cent, in the area planted to cotton in the United States. How many acres were planted last year?

* Use 500 lb. to the bale.

A LESSON ON COTTON.

5. Texas now has 9,156,000 acres planted to cotton, Georgia ½ as many, and Mississippi ¾ as many as Georgia. How many acres are planted to cotton in each of these States?

6. Texas produces more than 2,300,000 bales of cotton. What is the average number of bales per acre? What part of the 1907 cotton crop did Texas furnish? (See problem 3.)

7. Of the long staple cotton (similar to our sea-island cotton) Egypt grows annually 125,000 bales (750 lb. to the bale). How does this compare with our 1908 crop of 93,858 bales of sea-island cotton, having 500 lb. to the bale?

Things to Find Out.

1. What is " sea-island " cotton?

2. In what shapes are bales packed?

3. Where is the cotton-producing region of the United States?

4. What State leads in cotton production?

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1. A Georgia farmer had a field 40 by 60 rods planted to cotton. His land yielded 200 lb. of lint to the acre. How many bales of cotton did it produce?

2. The ginning of this crop cost him $1.20 a bale, the compressing 35¢ a bale, and a month's storage and insurance 25¢ a bale. His New York agent's commis-

sion was 60¢ a bale. What were the expenses up to this point?

3. He paid 54¢ per 100 pounds to ship this cotton to New York by rail. How much would he have saved on it if he had shipped by water at 20¢ per hundred?

4. He received 9¢ a pound for the cotton. How much money did he clear?

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5. On a North Carolina cotton field of 3 acres, a farmer paid, for cultivation and fertilization, $21.25; for picking (1,800 lb.), $6, and for hauling and ginning, $4. Two-thirds of the weight of the crop was seed. He sold the lint at 9¢ a lb., and 36 bu. of the seed for $9. What was his profit?

6. On one of the best cotton farms near Raleigh, N. C., the manager and his family do much of the work. In 1903, on 80 acres, the labor cost was $2,872, the fertilizer was $600. There were 144 bales of cotton raised, which the manager sold at 15¢ per lb. What was the profit per acre?

7. By selecting the best seed from the first picking of the crop, an overseer on another farm in Raleigh is raising 2½ bales of cotton per acre. When the cotton sells at 15¢ a pound, what gross profit is received from these 80 acres more than from those owned by the farmer in problem 6?

8. In 1900 there were reported 1,418,000 cotton

farms, of which 849,000 were operated by whites. The whites owned 58 per cent of the farms they operated. What per cent of the total number of farms was owned by whites?

9. In problem 8, how many farms were operated by colored people? The colored farmers owned 19 per cent of the farms they operated. What per cent of the total number of farms did they own?

10. In 1860 the average price of cotton was 11¢ a pound; in 1863 it rose to $8\frac{6}{11}$ times as much. For what was it sold in 1863?

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11. A farmer in Egypt plants $1\frac{1}{3}$ bushels of cotton-seed to the acre. How many pounds of seed does he need for his two fields—one 24 by 16 rods and the other 32 by $20\frac{1}{4}$ rods? (Use 30 lb. to the bushel.)

12. How long would it take a man to pick $1\frac{1}{2}$ tons of cotton if he averaged 150 lb. a day? It would take 4 men how long at the same rate?

13. A man picks 130 lb. of cotton, at $\frac{1}{2}$¢ a pound, in one day. How much did he earn during October, 1910, Sundays being excluded?

14. A child picks 50 lb. of cotton a day, at $\frac{1}{2}$¢ a pound. How many weeks of 6 working days will it take him to earn $9?

15. A boy cotton picker in Egypt earns 20¢ per hundred pounds, and usually gathers 40 lb. a day. How much does he earn in a week? (6 days.)

Things to Find Out.

1. What is meant by " lint " in problem 1 ?

2. What other part of the cotton crop is marketable ?

3. Explain " storage and insurance " in problem 2.

4. Can you explain the great increase in the price of cotton in 1863 ? (See problem 10.)

Ginning.

1. Before the invention of the cotton gin by Eli Whitney, a man could separate not more than 2 pounds of lint from the seed in a day. Now there are gins which can turn out ten bales of lint daily. How long would it have taken a man to do this amount by hand ?

2. Local gins at present are able to pack cotton to the average density of 14 lb. per cubic foot. After being packed, a 500-lb. bale of cotton will contain how many cubic feet ?

3. Every bale not sent to local mills must go to some cotton compress and be reduced two thirds in size before shipment. What will be the number of cubic feet in a bale which occupied 45 cubic feet of space before being compressed ?

4. After the removal of the seed no other fiber is so free from impurities, for only 5 per cent loss is sustained by cleaning and bleaching. What is the weight

of a bale of cotton after the cleaning and bleaching?
When cotton is bought for 12¢ a lb., what is the loss
in money?

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. **5.** From 7 to 14¢ per lb. is paid for raw cotton.
Using the maximum price per lb., what is the total
cost of 10 bales of cotton when ginning costs $1.25
per bale and the compressing and shipping 40¢ a
. bale?

6. Before the oil mills were established, the highest
price put on cotton seed was 12½¢ per bushel, or, when
sold by weight, $8.29 per ton.   In 1900 the price was
$16 per ton.   Allowing 30 lb. to the bushel, what was
cottonseed worth per bushel in 1900?

7. We use annually in the United States 40,000,000
gal. of cottonseed oil.   Forty gal. of oil can be ex-
pressed from each ton of seed, and 700 lb. of oil cake
can be obtained from each ton.   From the above quan-
tity, how many lb. of oil cake can be obtained?

8. In 1901 the cotton seed crop was 4,830,280 tons.
Fifty per cent of this was manufactured into oil.   At
40 gal. per ton, how many gallons of oil were pro-
duced?

Things to Find Out.

1. In problem 7, explain " expressed."
2. For what is oil cake used?

Cotton Mills.

1. In the year previous to the opening of the Civil War there were 1,091 establishments for the manufacture of cotton cloth, with an average product valued at $106,033. In 1890 there had been an increase of 179 per cent in the value of the product. What was the value in 1890?

2. In 1860 the average daily wage of a cotton-mill operative was $1.03. In 1890 it was 55.3 per cent higher. What was the average daily wage in 1890?

3. The pay for overseers in the weaving department of a cotton mill in Massachusetts in 1843 was $1.75 per day of 13 hours. In 1891 it was $5 per day of 10 hours. What was the per cent of increase in wages? The per cent of decrease in hours?

4. In weaving, in the olden time, in this country, an adult hand-loom weaver wove from 42 to 48 yards of common shirting per week. Now a weaver tending 6 power looms in a cotton mill will produce 1,500 yards in a week of 6 days. How long would it have taken the hand weaver to do this, at the rate of 48 yd. per week?

5. In a cotton mill in Columbia, South Carolina, there are 104,000 spindles at work in one room. One worker can attend to 76 spindles. How many workers are needed to attend to the entire number of spindles?

6. In South Carolina, in 1905, there were 37,271 wage earners in cotton mills earning $7,701,689. What was the average wage per year?

7. In Massachusetts, in the same year (1905), there were 88,033 cotton workers earning $32,352,325. In which State was the average wage higher? What per cent higher?

8. In 1905 there were 310,458 wage earners in cotton mills in the United States earning $94,377,696. What was the average wage? Massachusetts and South Carolina together employed what per cent of all the cotton operatives?

9. Among these 310,458 workers 46.9 per cent were men, 40.2 per cent were women, and the rest were children under 16 years of age. How many children were working in cotton mills in 1905?

10. There were 973 cotton mills in the United States in 1900, 300 of which were located in or near cotton plantations. What per cent of the cotton mills were in the North?

Things to Find Out.

1. In problem 1, what was the year " previous to the opening of the Civil War "?

2. What is a spindle?

3. Which States lead in cotton manufacture?

4. In which States are children under 16 years of age prohibited from working in mills?

5. Can you think of some specially favorable conditions which tend to foster the establishing of cotton mills in the Southern States?

Cotton Imports and Exports.

1. In one day, November 1, 1904, 200,000 bales of cotton were exported? At 10¢ a lb., what was this cotton worth?

2. In 1907 the United States imported from Egypt 168,122 bales of raw cotton, from the United Kingdom 19,726 bales, from Peru 7,619 bales, and from other countries (Mexico chiefly) 33,326 bales. What was the total importation for 1907? What per cent came from Egypt?

3. In 1903 the value of our exported cotton was $350,000,000, against $600,000,000 for all other agricultural exports, animal and vegetable. The cotton exportation was what per cent of the total agricultural exportation?

4. Our production of sea-island cotton in 1908 was 93,858 bales. Twenty-seven per cent of this crop was exported. How many bales were sent out from this country?

5. The United Kingdom bought two thirds of the entire exportation of sea-island cotton in 1908. How many pounds of this cotton were exported from the United States to the United Kingdom?

6. In 1908 we exported 8,889,724 bales, whereas our total production of cotton for that year was 13,432,131 bales. What per cent was exported?

Things to Find Out.

1. What is the United Kingdom?

2. Which nations are our best foreign customers in cotton?

3. Why do we import Egyptian cotton?

4. Why is Peruvian cotton in demand here?

5. Since 1905, what has been the chief cotton port of the United States?

6. What is the chief cotton port in England?

2

WOOL.

Wool Growing.

1. There are said to be 30 distinct varieties of sheep in the world, $\frac{7}{15}$ of which are natives of Asia, $\frac{1}{3}$ of Africa, $\frac{2}{15}$ of Europe, and the rest of America. What per cent of the world's varieties are natives of America?

2. The total production of wool in the United States in 1907 was 298,294,750 lb., which was a decrease of 420,380 lb. as compared with the clip of 1906. What was the clip of 1906?

3. After being scoured, this wool weighed 130,359,-118 lb. and was valued at $78,263,165. What was the average value per lb. in 1907?

4. Montana's clip in 1907 was 30,820,000 lb. This was what per cent of the total clip?

5. After the scouring process Montana's production of 30,820,000 lb. weighed 11,403,400 lb. How many pounds were lost in the scouring?

6. In 1907 Wyoming had 4,484,931 sheep of shearing age. The average weight of each fleece was 7.5 lb. What was Wyoming's total clip? At the average price of 22¢ per lb., what was the value of this production?

7. There are usually 250 lb. of wool in each bale. How many fleeces does it take to make a bale when an average of 6¾ lb. is sheared from each sheep?

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1. Ten cashmere goats furnish enough wool for a shawl 4.5 ft. square. How many sq. ft. of shawl are furnished by the wool from one of these goats?

2. Each " under coat " of wool used in the shawls weighs 3 ounces and is worth, in its native country, $1.75 per lb. What is the value of the wool in each shawl?

3. In Iowa, the owner of some Angora goats reports that 100 Angoras can keep cleared of brush 40 acres of pasture land. He owns 500 such acres, and there-

fore he needs how many Angoras to clear his land?
What part of an acre can one goat clear?

4. Each goat, if of high breed, shears 3 lb. of fiber,
worth 30¢ a lb. What are the fleeces of 100 goats
worth at each shearing?

5. An owner is liable to lose 30 per cent of the
mohair because of the " noils " (short hairs which
must be combed out). Noils are worth only 16¢ a lb.
According to this, what is the real value of the shear-
ing in problem 4?

6. The 8 mohair mills in the United States con-
sumed, in 1899, 1,119,465 lb. of imported mohair,
which was an excess of 42,465 lb. over the consump-
tion of domestic mohair. What was the consumption
of foreign and domestic mohair in that year?

Things to Find Out.

1. What is the meaning of the terms " scoured,"
" clip," " fleece "?

2. Which of our States stands first in the number
of sheep raised?

3. In what part of the world are the largest number
of sheep raised?

4. From what place were Angora goats first ob-
tained?

5. What dress material is made from the hair of
the Angora goat? Is there another name for this
material?

Wool Manufacture.

1. The first wool mill in our country was one set up for fulling in the town of Rowley, Mass., in 1638. How many years ago was this mill started?

2. In 1860 the average daily wage of the woolen mill operative was 87.3 cents. In 1890 the average wage was $1.24. What was the per cent of increase in 30 years?

3. An expert sorter of wool can examine 90 lb. a day. How long does it take him to sort a car lot of 40 bales, allowing 250 lb. to the bale?

4. Thirty cents per lb. is the maximum price paid for raw wool. On a bale of wool the loss from scouring was $33.75. What was the per cent of loss?

5. The smallest car lot of wool is 10,000 lb. After the scouring, a car lot was found to weigh only 4,500 lb. What was the per cent of loss by scouring?

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6. Our factories produced $297,000,000 worth of woolen goods in a certain year. The materials cost 61 per cent, the labor 19 per cent, the salaries of officers 2 per cent, and the miscellaneous expenses 6 per cent of this sum. How much is expended for each of these items and how much is left for profit?

7. A small piece of 75-cent gray serge was tested for the presence of cotton. The serge sample weighed 4.9952 grams before being boiled in the caustic potash

(a wool-dissolving solution). After the boiling the cotton residue weighed 2.4683 grams. In this boiling process, 5 per cent, or 0.1234 gram, of cotton were lost. What per cent of the serge was wool?

8. A sample of 49-cent mohair weighed 7.7471 grams. After boiling it in the caustic potash, the chemist found that 30 per cent was cotton. What was the weight of the woolen part?

9. It costs 69¢ a hundred lb. to ship woolen cloth from Philadelphia to Chicago. How much would Chicago save in freight on 1,000 tons of cloth by manufacturing it at home instead of. buying it in Philadelphia?

10. It costs 46¢ a hundred to ship wool in car lots from Cleveland to New York, and 53¢ a hundred for smaller amounts. The smallest car lot of wool is 10,000 lb. If a man has 9,500 lb. to ship, is it better for him to ship it as a car lot or to pay the 53¢ rate? Give the cost in each case.

Things to Find Out.

1. What city is the great wool market of the United States?

2. What is the greatest wool-manufacturing city of the United States?

3. What is a " fulling " mill?

4. What is a " sorter " of wool?

Imports and Exports of Wool.

1. In 1900 our total consumption of wool was 436,-662,516 lb. of which 34.4 per cent was foreign. How many pounds of domestic wool were consumed in that year?

2. The total importation of foreign wool in 1907 into the markets of New York, Philadelphia and Boston was 194,194,182 lb., of which 39,762,115 lb. came from the Chinese Empire and 52,538,582 lb. from Australasia. How many bales of 250 lb. each were imported from other countries?

3. The figure used·above (194,194,182 lb.) represented 98.5 per cent of the total quantity of wool imported into all parts of the United States. How much wool was imported in 1907?

4. In 1909 the total production of wool in the United States was 328,110,749 lb. of which all but 28,376 lb. was retained for domestic consumption. The total consumption of both foreign and domestic wool was 590,996,078 lb. What quantity of foreign wool was used in 1909?

5. In 1909 the United States imported manufactured woolen goods to the value of $18,048,453, on which was collected duty amounting to $16,278,827. What was the average *ad valorem* rate of duty on imports of manufactured wool in 1909?

6. In 1909 the value of our imports of unmanufactured wool was $34,758,788. The duties collected

on these imports came to \$17,082,989. What was the average *ad valorem* rate of duty?

Things to Find Out.

1. Why does the United States import raw wool? Why manufactured wool?

2. What is meant by " domestic consumption "?

3. Explain the high tariff on manufactured wool.

4. Explain " *ad valorem.*"

5. Where is Australasia?

3

SILK.

Silk Culture.

1. Some authorities put the date of the discovery of silk in China as early as 2640 B.C. How many years ago is that date?

2. In 552 A.D., two Greek monks brought the secret of silk culture into Europe. For how many years has Europe known the secret?

3. Silk culture in America started in 1622 when James I. sent silk worm eggs to Virginia. How many years ago is that?

4. A California woman bought an ounce (40,000) of silk worm eggs. Only ⅝ of the eggs hatched. These worms grew, spun cocoons, and emerged as moths. One-half of the moths laid eggs—350 each—and ⅘ of the eggs were fit to sell. How many ounces did she sell?

5. Before spinning the cocoon a silk worm is 3 inches long. It loses 58⅓ per cent of its length during the process of spinning. How long is the worm when the cocoon is finished?

6. An ounce of eggs often yields 80 lb. of cocoons. How many cocoons weighing 5 grains each can be obtained from an ounce of eggs? (1 lb. = 7,000 grains.)

7. How many of these cocoons would it take to make a pound of raw silk? (No allowance made for waste.)

8. When a small cocoon weighs 3.5 grains, how many cocoons does it take to make a lb. of raw silk?

9. The amount of silk produced by each worm in spinning its cocoon is from 400 to 1800 yards of very fine fiber. Eight of the cocoon fibers are joined together into one fiber and reeled to make the '' raw silk '' of commerce. When there are 96 of the original cocoon fibers in a single thread of sewing silk, how many of the eight-ply raw silk threads must have been twisted together?

10. Six women reeled 158.4 lb. of silk from some cocoons in 26.4 days. Each woman reeled what amount per day of 10 hours? How many ounces in one hour?

11. How long would it have taken one woman to reel all of the silk? How much time would four women have taken for the work?

Silk Manufacture.

1. The first silk mill in the United States was set up in Connecticut, in 1760. How old is silk manufacture in the United States?

2. The hanks of raw silk lose about 25 per cent of their weight in the boiling process. What will be the weight of 3,240.75 lb. after being boiled?

3. After being boiled the weight of a quantity of raw silk was found to be 1,620.75 lb. What was the weight before it was boiled?

4. In a silk mill in New York City, the warpers are paid $18 per week. The weavers are paid 25¢ per yd. and they usually weave 10 yd. a day. In a year of 52 weeks what does the warper gain over the weaver?

5. One lb. of raw silk sometimes makes 20 yd. of taffeta. How many lb. of raw silk does one of the weavers in problem 4 use in her week of 6 days?

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6. Taffeta silk selling for less than one dollar a yard is often " weighted " 70 per cent. Then instead of using one pound of raw silk for 20 yd. of taffeta, how many ounces of raw silk could be used and how many ounces of " weighting? "

7. When the silk manufacturer pays $3.50 per lb. for raw silk, what does he save in the making of 100 yd. of taffeta by " weighing " the raw silk 40

per cent? (Allow 1 lb. of raw silk to 20 yd. of goods.)

8. In a silk thread mill, labels are printed directly on the wood of the spools with a speed of 120 spools per minute. Taking out a half hour for interruptions and another half hour for lunch, how many spools are printed in a working day from 8 A.M. to 6 P.M.?

9. In 1905, New Jersey had 239 silk mills; New York, 123; Pennsylvania, 168; Connecticut, 43, and other states 51. How many silk mills were there in the United States in 1905? What per cent of them were in New York State?

10. New York City has 30 silk mills. This is what per cent of all the silk mills in the United States?

11. In 1902 the silk manufactures of the United States amounted to $110,000,000. The import of manufactured silk amounted to 25 per cent of the domestic manufacture. What was the value of the foreign silk?

12. The total output of our silk industry in 1905 was a little over $133,000,000. The total wages paid were a little less than $27,000,000. The wages were what per cent of the product?

Things to Find Out.

1. What is " raw " silk?

2. Why is raw silk boiled?

3. What is a warper in a silk mill?

4. Why are silk goods sometimes weighted?

5. Is the weighted silk durable? Explain.

6. What other items of expense does the silk manufacturer have besides the payment of wages?

7. In 1870 there were only 86 silk mills in the United States. How do you explain the growth from 1870 to 1905?

Silk Importation.

1. In 1902 the importation of raw silk from Japan was 6,197,795 lb., from China 3,027,608 lb., from Italy 2,567,752 lb. What was the total importation from these three countries in 1902? What per cent came from Japan?

2. In 1902 the value of the raw silk imported into the United States from 12 foreign countries was $41,-714,331. The number of pounds imported was 12,-620,682. What was the average price per lb.?

3. The imports of raw silk into the United States in 1904 reached 16,037,411 lb. valued at $55,373,440. Give the average value per lb.

4. The imports of manufactured silk in 1904 were valued at $31,030,522, whereas the value of our own silk manufactures was $107,260,000. The value of domestic silk was what per cent of the value of the total consumption?

5. Between 1870 and 1909 the average price per

pound of raw silk decreased from $5.25 to $3.33. Give the per cent of decrease.

6. During this same period the value of raw silk importations increased from $4,000,000 in 1870 to $75,000,000 in 1909. How many fold increase is this for the 39 years?

7. The value of the manufactured silk importations between 1870 and 1909 increased by $5,600,000, only —or 21 per cent. What was their value in 1870? In 1909?

8. Georgia exported in 1735, eight pounds of raw silk. Twenty-four years later, 10,000 lb. or $75,000 worth were exported. What was the average value per pound in 1759? At that rate what was the first exportation worth?

Things to Find Out.

1. Why does the United States import practically all of the raw silk used in the factories? From what three countries does most of our raw silk importation come?

2. Is there any tariff on raw silk? What is the reason for this?

3. What is " domestic silk? "

4. Why did not the demand for foreign manufactured silk keep pace with the increase in population? (See problem 7.)

4

FLAX—PROBLEMS.

1. A farmer who plants for the seed crop sows at the rate of 2½ pecks of seed per acre, but one who plants for the sake of the fiber sows at the rate of 1¾ bushels per acre. How many bushels of seed will each farmer need for a field of 4½ acres?

2. A farmer obtained 620 lb. of fiber and 10 bushels of seed from an acre of flax. He sold the fiber at 11¢ a lb., and the seed at $1 per bushel. His profit on one acre was $38.17. What were his expenses?

3. A Kansas farmer, by means of irrigation, produced 28 bushels of flax seed from one acre of ground. How many acres would the farmer in problem 2 need to cultivate in order to get 28 bushels?

4. The green flax from 1 acre of land in the south of Ireland weighed 5 tons and 9 cwt. How many acres must the farmer in problem 2 cultivate in order to raise this amount of flax?

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5. In 1902 the entire flax seed crop of the United States amounted to 29,284,880 bushels, of which 53 per cent was grown in North Dakota. How many bushels did North Dakota raise?

6. There are 3,700,000 acres in the United States devoted to flax growing. In 1902 what was the average number of bushels of seed per acre?

7. At the average yield of 20 lb. of oil to the bushel, how many lb. of oil did North Dakota furnish in 1902? How many gallons of oil at the rate of 2 lb. to a quart?

8. A bushel of flax seed can be converted into 2½ gallons of oil. After deducting from the entire seed crop of 1902 two million bushels for the next year's seeding, how many gallons of oil could be manufactured from this crop?

9. From a bushel of flax seed 37½ pounds of oil cake (for cattle food) can be made. How many tons of oil cake could be made from the crop of 1912 after the 2,000,000 bushels have been saved out for seeding?

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10. Our importations of flax fiber amount to $2,000,000 annually. This is what per cent of our annual importation of raw silk, which now amounts to $42,000,000?

11. From 12 to 30¢ per lb. is paid for raw flax fiber. What is the loss in money on a ton of flax bought at 16¢ per lb., when the loss in weight from cleaning and bleaching is 20 per cent?

12. In the year ending June, 1909, there were imported into the United States 1,233 tons of hackled flax fiber, known as '' dressed line '' and valued at $623,071. What was it worth per pound?

13. The duty on the flax in problem 12 was $67.20 per ton. What was the duty per pound?

14. The imported flax fiber not hackled or dressed came in under a tariff of $22.40 per ton. What was the duty on the 6,137 tons which were imported during the year ending June, 1909?

15. Our European importation of manufactured linens amounts to $22,000,000 annually, and of manufactured silks to $32,000,000. For every dollar paid for foreign linens, how much is paid for foreign silks?

16. In 1890 there were 5 linen mills in the United States with products valued at $2,880,341. In 1905 there were 15 mills with products valued at $5,856,-388. What was the per cent of increase in the number of mills during that period? In the value of their products?

Things to Find Out.

1. Oil made from flax seed is called by what name? For what is it used?

2. Is the flax in the United States raised chiefly for the seed or for the fiber?

3. Explain the two ways of sowing the seed mentioned in problem 1.

4. In problem 3 what is meant by irrigation?

5. Why is there no attempt in the United States to manufacture fine linens?

INDUSTRIAL AND CIVIC PROBLEMS.

1

ARE TRADE SCHOOLS NEEDED?

1. The little kingdom of Bavaria, with a population of 6,000,000 has 290 trade schools. This means how many inhabitants to each school? The United States with almost 90,000,000 inhabitants has fewer schools than Bavaria. According to Bavaria's proportion, how many trade schools ought we to have in the United States?

2. The city of Munich with a population of 500,000, spends annually 600,000 marks (a mark is 25¢ of our money) for teaching 46 different trades in the schools. According to this proportion, how much ought Greater New York, with its population of more than 4,000,-000, to be spending in public trade schools?

3. According to the census there were in 1900, of males over ten years of age at work in New York City 1,102,471. Of these 5 per cent were engaged in the professions and about 40 per cent in trade and manufacturing pursuits. In view of these facts, how many of those men and boys, ought to have gone to academic high schools and how many to trade schools?

4. In 1908–09, the number of boys graduated from the elementary schools in New York City was 13,072. According to the percentages given in problem 8, how many of these boys should have gone to academic high schools and how many to trade schools?

5. Of the 1,400 men in confinement at one time in a reformatory in New York State, only 1.6 per cent of them had trades. How many of these prisoners had never learned a trade?

6. About 10 per cent of these men were deficient in mathematical reasoning and had to be taught industrial arithmetic problems. How many of them were in need of arithmetic?

7. In 1890 the total amount spent by state and local governments in the United States for the defective, criminal and poor was nearly $52,000,000. How many public trade schools costing annually $200,000 each would this sum have supported?

2

OUR PUBLIC SCHOOLS.

1. The total number of pupils enrolled in the public schools of the United States in 1908 was 17,061,-962. The total expenditure for them was $371,344,-410. What was the average expense to the country per pupil?

2. In anyone of our cities where 10,000 children

enter the school every year for the first time, only
1,775 ever go to the high schools and not more than
350 graduate from them.   What per cent of every
10,000 children enter high schools?   What per cent
of those entering fail to graduate?

3. In New York City the amount expended for pub-
lic school purposes during the year ending July, 1908,
was $35,462,823.   The number of pupils enrolled was
717,250.   What was the expense per pupil to the city?
(These figures include all five boroughs.)

4. The net enrollment of 1907–08 in New York
City was increased in 1908–09 by 1.81 per cent.   How
large was it in 1908–09?   (See problem preceding.)

5. There are in New York City, in the five boroughs,
528 public schools.   Of this number, three are training
schools, nineteen are high schools, three are truant
schools, one is a nautical school and the rest are ele-
mentary.   How many elementary schools are there in
Greater New York?

6. In the evening elementary schools the average
nightly attendance in 1907–08 was 33,273.   In 1908–
09 it was 32,019.   What was the per cent of decrease
in 1908–09?

7. In June, 1910, the New York School Masters'
Club commemorated the first Dutch school in New
York, opened 272 years ago, by unveiling a bronze
tablet at Bowling Green.   In what year was that
Dutch school opened?

3

CHILDREN WHO ARE BREADWINNERS.

1. The total number of persons employed in manufacturing in the United States in 1905 was 6,157,751. Of these, 167,066 were boys and girls under 16. What per cent of the whole number were child laborers?

2. There were in 1900 in New York State 384,760 boys between the ages of 10 and 15. 14.4 per cent of them were breadwinners. The total number of girls between those same ages was 384,901 of whom 9.5 per cent were breadwinners. How many boys and girls in this State were breadwinners in 1900?

3. In shops, stores, and factories in the District of Columbia there are employed 500 children under 16 years of age. The school population is 50,000. What is the relation of the number of working children to the school population?

4. The Commissioner of Labor in New York State reported 3,600 children illegally employed in factories in 1906. In 1909 he reported that this number had been reduced by 2,778. How many children were employed illegally in 1909 in New York State?

In the four great Southern manufacturing states, North Carolina, Georgia, South Carolina and Alabama, a large number of children are employed in manufacturing. Not 80 per cent of the children be-

tween 10 and 14 years of age in these States are able to read and write.

1. In South Carolina there are 104,694 children from 10 to 15 years old. 94.8 per cent of these are regularly employed. How many of the children in this State are breadwinners?

2. Of all the child laborers in South Carolina 38,-917 are girls. How many boys are there?

3. In Georgia there are 165,865 boys and girls between 10 and 15 years of age. Not more than 20 per cent of them are able to read and write. How many children in Georgia are illiterate?

4. In Alabama there are 80,989 wage-earning boys and 41,664 wage-earning girls between the ages of 10 and 15 years. The number of child laborers are what per cent of the whole number of children (137,232) of that age in the State?

5. In North Carolina there are 110,407 children working for wages. Of this number 77,986 are boys. What per cent of all those earning their living are girls?

6. The total number of children in North Carolina of the age mentioned, is 141,489. What is the number of children not working for wages in North Carolina?

Things to Find Out.

1. Of what advantage to the mill owner is child labor?

2. Why do parents let their little children work in factories?

3. Why should manufacturing states have child labor laws?

4. Are there child labor laws in all of our states? Explain.

4

PEOPLE WHO CANNOT READ OR WRITE.

1. In 1870 in the United States there were 200 illiterates in every thousand of population. In 1900 this proportion had decreased by 46½ per cent. What was the proportion in 1900?

2. Counting the population at about 76,000,000 in 1900 find out how many illiterates there were at that time.

3. In 1900, New York State, with a population of 7,268,894 had 318,000 illiterates; Pennsylvania, with a population of 6,302,115 had 299,376 illiterates; Illinois, with a population of 4,821,550 had 157,958 illiterates; and Ohio, with her 4,157,545 people had 131,-541 illiterates. In each of these leading States what per cent of the people were illiterates? (Illiterates here include those ten years of age and upward.)

4. Among the illiterates in New York State in 1900 there were 4,740 children between the ages of 10 and 14. In Pennsylvania there were 6,326 illiterate children. In each of these States what per cent of the

total number who could not read or write were children?

5. Eighty per cent of the 318,000 illiterates in New York State in 1900 were foreign born. How many were native born?

6. Compare with the above statement the fact that there were 29,180 illiterates born of native white parents that year in New York State and 11,026 less born of foreign white parents. Find the number not able to read and write who were born of foreign parents.

7. The six leading manufacturing states—Massachusetts, Ohio, New Jersey, Illinois, New York, and Pennsylvania—have 20,775 children from 10 to 14 years of age who cannot read and write. 2,069 of this number live in New Jersey. What per cent of the 20,-775 illiterate children are in New Jersey?

8. The population of New Jersey is 1,883,669. 4.6 per cent of the people cannot read or write. Find the total number of illiterates in New Jersey.

Things to Find Out.

1. Why are there so many illiterates in the Eastern States?

2. Of what disadvantage is illiteracy to the individual? To the community?

3. Discuss the statements made in problems 5 and 6.

4. Are there compulsory education laws in all of our States?

5

SOME MODERN INDUSTRIES.

1. In the industries of the United States (factory, mechanical and neighborhood), there were employed in 1870—1,615,598 men, 323,770 women, and 114,628 children under 16 years age. What per cent of the total number of workers were women? What per cent were children?

2. The number of women employed in these various industries in 1900 was 1,029,296. This was 19 per cent of the whole number employed. How many persons were working in these places in 1900?

3. There were 4,110,527 men in the industries referred to in problem 2. How many children were there?

4. There were in 1900 in the United States, 23,-485,559 women over 16 years of age. Of this number 20.6 per cent were breadwinners. How many women earned their living in this country in 1900?

5. For this same year (1900) the census reported 4,760,825 girls from 10 to 15 years of age, 10.2 per cent of this number were breadwinners. How many girls of this age were breadwinners in 1900?

6. Using the figures in the two preceding problems find the total number of girls and women in the United States who earned their living in 1900.

7. There were 4,766,964 persons employed in trade and transportation in the United States in the year 1900. This number was 16.3 per cent of all those who were earning a living in this country in that year. How many persons were in gainful occupations?

8. Only 4.3 per cent of the total number in gainful occupations (see answer to above problem) were found in professional services. How many persons were in the professions in 1900?

9. There were 86,120 women milliners in the United States in 1900, and they exceeded the number of men milliners by 84,381. How many men milliners were there? What was the total number of milliners?

10. In the same year there were 346,884 dressmakers in the United States of whom 2,090 were men. How many women dressmakers were there?

11. In our cotton mills in 1900 there were 125,788 men workers and 120,603 women workers. In the silk mills there were 22,023 men and 32,437 women. In the woolen mills there were 42,566 men and 30,630 women. By how many did the total number of cotton mill operatives exceed those of the woolen and silk mills taken together?

12. The total number of female workers over 10 years of age in the cotton mills was 120,603. The number over 15 years of age was 104,944. How many girls between the ages of 10 and 15 were employed?

13. There are 76,658 manufacturing establishments

in New York State, 79.6 per cent of which are located in cities and large towns. How many of them are located in country places?

Things to Find Out.

1. Compare the per cent of women workers in 1870 with that of 1900. (See problems 1 and 2.)

2. Compare in the same way the proportion of child laborers. (See problems 1 and 3.)

3. Name some of the industries in which women are engaged.

4. Why are the greater. number of manufacturing establishments in New York State located the larger places?

6

SOME EARLY INDUSTRIES.

1. It is supposed that the hand-spindle and whorl for making thread began to be used about 2000 B.C. When the spinning wheel was invented in 1500 A.D., how long had women been using the spindle and whorl?

2. The application of steam power to spinning machinery was made in England in 1760. During what part of the period from 2000 B.C. to the present year (1910) has power machinery been used for spinning?

3. The power-loom, invented in 1785, did not come

into use in England until 21 years later. When was it first used in England?

4. In this country, power-looms were set up in factories for the first time in Waltham, Mass., in 1814, when a cotton mill was established there. For how many years have we carried on weaving by power?

5. Spinning by power machinery was begun in 1790 (in Rhode Island). How old is the power-spinning industry in the United States?

6. In January, 1815, a man and his family came to work in a Lancaster, Mass., cotton mill. Find the weekly income of the family from the following record which had been preserved in the mill:

Himself	$5.00
His son, Robert Rier, 10 years of age	.83
Daughter Mary, 12 years of age .	1.25
Son William, 13 years of age . .	1.50
Son Michael, 16 years of age . .	2.00
His sister, Abigal Smith . . .	2.33
Her daughter Sally, 8 years of age .	.75
Her son Samuel, 13 years of age .	1.50

7. It is said that during the first part of the last century (1800 to 1840), very few of the women spinners and weavers in the New England cotton-mills earned as much as $4 a week. The average weekly wage was about $2. In 1900 the average wage for women spinners was $6, and for women weavers $7.50.

During the period between 1840 and 1900 the average weekly wages of women spinners and weavers had increased by what per cent?

7

FACTS ABOUT OUR COUNTRY.

1. The first census of the United States, taken in 1790, gave a population of 3,929,214 persons. The twelfth census, taken in 1900, enumerated 71,764,520 more persons than there were in 1790. What was the population in 1900? (This did not include the Indian reservations, Alaska or Hawaii.)

2. The population of the United States at the present time is about 90,000,000. This is almost 5 per cent of the world's population. How many people are there in the world?

3. The wealth of the United States was estimated in 1904 to be $107,104,211,917. What is the average wealth per capita in the United States? (Use 90,-000,000 population.)

4. Since 1852 the area of the United States has been 3,026,789 square miles. The population in 1909 was estimated at 88,262,446. What was the average population per square mile in 1909?

5. What was the population per square mile in 1900? (See problem 1.) What was the per cent of increase in population from 1900 to 1909?

6. In 1860, when the total population of the United States was 31,443,321, the foreign born constituted 13.2 per cent of it. Find the number of both native and foreign born in 1860.

7. In 1900, with a total population of 76,303,387 (including Alaska and Hawaii) the number of foreign born was 10,460,085. What per cent were foreign born ?

8. In 1830 the first steam locomotive was successfully used. In 1869 there was through-rail connection from ocean to ocean. How old is the railroad in this country ? How long have we had transcontinental lines ?

9. In 1900, according to the census, there were in the states of the United States, 20,800,000 men of the voting age. Of these, 2,150,000 were unnaturalized foreigners. That left how many possible voters ?

10. The total vote cast in 1900 was 13,960,000. What per cent of the possible voters failed to vote ?

8

FACTS ABOUT OUR CITIES.

1. The population of Greater New York in 1908 was 4,338,322. This exceeded the population of Chicago by 2,172,267 and of Philadelphia by 2,847,246. Find the population of the two latter cities in 1908.

2. The population of Boston in 1908 was 28.4 per

cent of Chicago's population. It was what per cent of Greater New York's?

3. The area of Manhattan is 22 square miles. The population in 1905 was 2,112,697. What was the average population per acre?

4. The area of Greater New York is 326 square miles. The population in 1905 was 4,014,304. What was the average density per acre? (Compare this result with that of problem 3.)

5. In New York City only 12 per cent of the people own their homes. 614,474 homes are rented. How many homes are owned? What per cent?

6. In Chicago, which is next to New York in population, there are 86,435 homes owned and 258,582 homes rented. What per cent of the homes are owned?

7. In Los Angeles, Cal., there are 10,049 homes owned, which is 44 per cent of the number of homes. How many homes are there in Los Angeles? How many of them are rented?

8. In Philadelphia there are 251,652 homes, of which 78 per cent are rented. How many homes are owned?

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9. There were 8,000 women tailors in New York City (Manhattan and the Bronx) in 1900. This was 16 per cent of the whole number of tailors. How many men tailors were there?

10. In the same year there were 26,000 dressmakers (not including seamstresses), this number representing 520 per cent of the number of milliners. How many milliners were there?

11. There were 325,000 persons engaged in manufacturing and 2,800 in agriculture. For every person in agriculture there were how many in manufacture?

12. In the cigar-making establishments there were 9,000 men and 33⅓ per cent less women. How many cigar-makers were there?

13. In one year in New York City 20,000 workers were employed in making men's clothing, the value of which was $103,000,000. What was the average output per worker?

14. There were also 19,000 workers employed in making women's clothes valued at $102,030,000. What was the average output per worker?

9

OUR IMMIGRANTS.

1. In 1903, 24 per cent of the immigrants to the United States came from Austria-Hungary, 3 per cent from England and Wales, 4.7 per cent from Germany, 4.1 per cent from Ireland, 26.9 per cent from Italy, 8.2 per cent from Norway and Sweden, 15.9 per cent from Russia and Poland. What per cent came from other countries?

2. In the same year Italy sent us 230,622 immigrants. This was 21.3 per cent of the total number of immigrants. How large was the immigration in 1903?

3. Of the 1,285,349 immigrants arriving in 1907. there were 13,064 debarred from landing and 925 who returned within two years after their arrival. How many of them remained in the United States?

4. About 15 per cent of the new immigrants settled in New York City in 1907. How many of them remained in New York! *

5. In the total immigration of 1909   751,786 persons . there were from North Italy, 25,150 immigrants and from South Italy, 165,248. What per cent of the entire number came from Italy!

6. Of the 751,786 immigrants arriving in the United States in 1909 there were 191,049 persons over 14 years of age who could neither read nor write. What per cent of the immigrants were illiterates!

Things to Find Out.

1. Explain the large proportion of Italian immigrants. Why are there more from Southern Italy!

2. For what reasons are immigrants debarred!

3. Why do so many of the immigrants settle in New York City! Are they needed there!

4. Are immigrants needed in other parts of our country! Where!

* Do not include the 13,064 who never landed.

SOURCES OF INFORMATION.

Industrial Evolution of the United States, Carroll D. Wright.

Bureau of Commerce and Labor, United States Government.

Bureau of the Census, United States Government.

Government Agricultural Reports on Cotton, Flax, Wool, Silk.

Statistical Abstract of the United States.

Women in Industry, Edith Abbott.

Women and the Trades, Elizabeth Beardsley Butler.

Reports of National Society for the Promotion of Industrial Education.

Report of National Association of Wool Manufacturers.

Actual Government, Albert Bushnell Hart.

Pamphlets from Textile Manufacturers.

Textiles and Clothing, Kate Heintz Watson.

School of Household Arts, Teachers' College.

Hull House Labor Museum.

The Community and the Citizen, Arthur W. Dunn.

Annual Report New York City Public Schools.

Charities and the Commons, April 4, 1903; December 6, 1902.

World's Work, November, 1904.

Child Labor in New York City Tenements, Mary Van Kleeck.

The Wreck of the Home, Annie S. Daniel.

The Sweatshop, Consumers' League, New York City.

Records of Employment Secretary, Manhattan Trade School, Elsie LaG. Cole.

INDUSTRIAL ARITHMETIC

ANSWERS TO PROBLEMS

MILLINERY

PAGE 4

1. { 6⅔ or 7 widths
   { 1¹³⁄₁₆ yd. or 1⅞ yd.
2. { 8 widths, 2 in. rem.
   { 7 yd., 4 in. or 7⅛ yd.
3. 1⅛ yd.
4. { 24 in. used
   { 21 in. rem.
5. 33⅓ in.

PAGE 5

1. 14 strips, 1 in. rem.

PAGE 6

2. { 1½ in. for plain fold
   { 2¼ in. for French fold
3. ⅔ of a yd.
4. { 36 strips
   { 46 yd.
5. 4½ strips
6. 3 in. through the bias

PAGE 7

1. { ½ in.
   { 2 in.
   { 1 in.
2. 5½ in.
3. 8 tucks
4. 9 in.
5. { 3½ in.
   { 11½ in.

PAGE 8

1. $1.50
2. 15¢.
3. $7.84
4. 33⅓¢.
5. $1.50
6. $2.00
7. $1.56
8. 87½¢.
9. $4.50

1

PAGE 9

10. $4.50
11. $1.50
12. $3.60
13. $\begin{cases} \$4.50 \\ 100\% \end{cases}$
14. 1½ doz.
15. 1⅔ doz.

PAGE 9. WRITTEN EXERCISE

1. $3.37½
2. $\begin{cases} \$7.50 \\ \$18.00 \end{cases}$
3. 3 doz.
4. $19.52

PAGE 10

5. 66⅔% gain
6. 83¾ yd.
7. $\begin{cases} \$121.92 \\ 400\% \end{cases}$
8. $10.20
9. 38 frames, ½ yd. rem.
10. $27.50
11. $6.00
12. $\begin{cases} \$4 \\ 44\frac{4}{9}\% \text{ gain} \end{cases}$

PAGE 11

1. $2.25
2. $36.00
3. $18.00
4. $6.12½
5. $9.00
6. $1.50

PAGE 13

7. $3.00
8. 95¢.
9. 5 lengths
10. 12 lengths
11. 1⅛ yd.
12. 12 hats
13. $1.75
14. 10 yd.
15. 100 yd.
16. 200 yd.
17. 66⅔%
18. $8.00
19. 20¢.

PAGE 14

20. 100 bolts
21. 9 yd.
22. $2.00
23. $4.20
24. $1.10
25. $1.20

WRITTEN EXERCISE

1. $\begin{cases} 72¢. \\ 1\frac{1}{4} \text{ gross} \end{cases}$
2. $5.25
3. $8.60

PAGE 15

4. $7.60
5   60%
6. 89.47%
7. $5.62½

8. $\begin{cases} \$2.00 \\ 16\frac{2}{3}\% \end{cases}$

9. $\begin{cases} \$22.68\frac{3}{4} \\ 37.93+\% \end{cases}$

10. $3.13

11. $4.80

12. $\begin{cases} \$12.50 \\ 40.98+\% \end{cases}$

13. $18.63

PAGE 16

14. 40¢.

15. $\begin{cases} \$63 \text{ gain} \\ 87\frac{1}{2}\% \end{cases}$

1. $16.15

PAGE 17

2. 41.17+%

3. $5.85

4. $7.40

5. $17.71

6. $\begin{cases} \$7.58 \\ 38.28+\% \end{cases}$

7. $\begin{cases} \$24 \\ 44\frac{4}{9}\% \end{cases}$

8. $\begin{cases} \$10.32 \\ 51\frac{3}{5}\% \end{cases}$

PAGE 18

9. $30.90

10. $28.11\frac{1}{9}

11. $10.50

12. $39.00

PAGE 19

1. $\begin{cases} \$52 \\ 73.07+\% \end{cases}$

2. 13.79+%

3. $170

4. $\begin{cases} \$40 \\ 75\% \end{cases}$

5. $\begin{cases} \$360 \\ 86.74+\% \end{cases}$

PAGE 20

6. 14 hats

1. $1,428.80

2. $46\frac{2}{5}\%$

3. $3,666\frac{2}{3}

4. $14\frac{2}{5}\%$

PAGE 21

5. $125.60

6. $\begin{cases} \$121.60 \text{ receipts} \\ \$76 \text{ expenses} \end{cases}$

7. $67\frac{1}{3}\%$

8. $\begin{cases} \$3,300 \text{ rent} \\ \$5,280 \text{ salaries} \\ \$660 \text{ packing, etc.} \\ \$264 \text{ bad debts} \\ \text{Total, } \$9,504 \\ \text{Profits, } \$3,696 \end{cases}$

9. $924

PAGE 22

10. $\begin{cases} \$3,756 \\ 64.43+\% \end{cases}$

SEWING

PAGE 35

7. 8½¢.
8. 56¼¢.
9. $38.62³⁄₁₆
10. 34¢.
11. { $2.82
    { 188%
12. 50 cards
13. 10 aprons, 2½ yd. rem.
14. $2.23¼
15. 26.31+%

PAGE 36

16. { $69.00
    { 48.93%
17. $2.27½
18. 8 lengths, 2 yd. rem.
19. { $7.87½
    { 8.40
20. $13.90
21. $3.76⁸⁄₁₅
22. { 17 waists
    { 52¼¢.

PAGE 37

1. { 10 blouses
   { 31½¢.
2. { 4½ yd.
   { $1.86¾

PAGE 38

3. { 8 blouses
   { 1½ pieces
   { 57c.
4. $12.50

5. { 72 yd.
   { $13.68
6. $4.80
7. $16.32
8. $1.24

PAGE 39

9. $4.24
10. $11.87½
11. $3.21¾
12. $32.59
13. $13.97½
14. { 14 skirts
    { $16.38

PAGE 40

1. 30 in.
2. { 28½ in.
   { 15.4¢.
3. { 12 bands
   { 12 aprons
4. { 10⅞ yd.
   { 98¢.
   { 7⁷⁄₃₀¢.

PAGE 41

5. 44 aprons
6. ———
7. ———
8. ———
9. ———
10. ———
11. 3 collars

6   INDUSTRIAL ARITHMETIC

12. $\begin{cases} 18 \text{ yd.} \\ \$1.50 \end{cases}$

1. $\begin{cases} \$2.95 \\ 7.86 + \% \end{cases}$
2. $3.20
3. $\begin{cases} \$2.46 \\ 18.16 + \% \end{cases}$
4. $\begin{cases} \$3.39 \\ 11.95 + \% \end{cases}$

5. $4.48 loss
6. $\begin{cases} \$1.50 \text{ loss} \\ 6\frac{2}{3}\% \end{cases}$
7. $28.95
8. $109.85

9. $\begin{cases} \$3.37 \\ 15.58 + \% \end{cases}$
10. $42.85 + \%$
11. $65.74 + \%$
12. $11.50

13. $\begin{cases} \$10.00 \text{ gain} \\ 32\% \end{cases}$
14. $\begin{cases} \$13.59 \text{ gain} \\ 32.94 + \% \end{cases}$
1. $153.30
2. $52

3. $55.39
4. $66\frac{2}{3}\%$
5. $75.25
6. $12.18 + \%$
7. $47.35

SHORT METHODS BUYING AND SELLING

1. $8.00
2. $3.00
3. $6.00
4. $9.00
5. $3.12½
6. $31.25
7. $45.00
8. $70.00
9. $62.50

10. $30.00
11. $30.00
12. $2.00
13. $11.00
14. $25.00
15. $5.00
16. $2.00
17. $4.00
18. $9.00
19. $25.00

PAGE 50

20. $5.55
21. $1.12½
22. $1.80
23. $1.80
24. 96¢.
25. $1.08
1. $3.75
2. 93¾¢.
3. $1.35
4. 99¢.
5. $1.25
6. $3.30
7. $2.25
8. $2.12½
9. $2.25
10. $2.50
11. $11.70
12. $2.66⅔
13. $3.00
14. $1.66⅔
15. $15.00
16. $11.00
17. $7.15

PAGE 51

18. $6.25
19. $3.75
20. $2.62½
21. 80½¢.
22. $3.12½
23. $2.12½

24. $12.60
25. $2.85

PAGE 52

1. $143
2. 17.29\frac{11}{18}$
3. $\begin{cases} 4\frac{1}{2}¢. \\ \$1.08 \end{cases}$
4. $2.16
5. $16.40
6. 9½¢.
7. 10 gross
8. 20¢.

PAGE 53

9. 18½¢.
10. $\begin{cases} 210\frac{1}{2} \text{ yd.} \\ \$17.54\frac{1}{6} \end{cases}$
11. 3¾ yd.
12. $9.18⅓
13. $3.00
14. 100%
15. 50%
16. 66⅔%
17. 9¢.
18. 45.83+%

PAGE 54

19. 56%
20. $4.37½
21. 31.57+%
22. 21.6%
23. 90.62+% gain

FACTORY SEWING

1. 30 hats
2. ———
3. 27 doz.
4. 20 doz.
5. $\begin{cases} \text{120 doz.} \\ \$28.80 \end{cases}$

6. $\begin{cases} \$21.14\ \frac{1}{7} \\ \$11.38\frac{6}{13} \end{cases}$
7. $\begin{cases} \$903.44 \\ \$450.00 \end{cases}$
8. 2,125 hats
9. $\$36.12\frac{1}{2}$
10. $\$12.75$
11. $\$11.25$

1. $\$4.76\frac{3}{10}$
2. $\$1.21\frac{3}{4}$
3. $32.60 + \%$

4. $\$20.57\frac{3}{10}$
5. $\begin{cases} \$33.84 \\ \$13.26\frac{7}{10}\ \text{profit} \end{cases}$
6. $\begin{cases} \$8.624 \\ \text{135 doz.} \end{cases}$
7. $77.30 + \%$ gain
1. $\begin{cases} \$40.00\ \text{per wk.} \\ \$240\ \text{during the busy} \\ \quad \text{season} \end{cases}$

2. $\begin{cases} \$240\ \text{during the slack} \\ \quad \text{season} \\ \$30.00\ \text{per wk. ave. for} \\ \quad \text{linen season} \end{cases}$

3. $\begin{cases} \$20.00\ \text{per wk.} \\ \$120.00\ \text{during busy} \\ \quad \text{season} \end{cases}$
4. $\begin{cases} \$12.00\ \text{per wk.} \\ \$15.00\ \text{per wk. ave. for} \\ \quad \text{linen season} \end{cases}$
5. $\begin{cases} \$45.00\ \text{per wk.} \\ \$225\ \text{during the busy} \\ \quad \text{season} \end{cases}$
6. $\begin{cases} \$616\ \text{for entire cloth} \\ \quad \text{season} \\ \$25.40\frac{5}{13}\ \text{ave. weekly} \\ \quad \text{wage for the year} \end{cases}$
7. $\$15.62\frac{1}{2}$ per wk.

8. $\begin{cases} \$9.37\frac{1}{2}\ \text{per wk.} \\ \$11.71\frac{7}{8}\ \text{ave. weekly} \\ \quad \text{wage for the season} \end{cases}$
9. $\begin{cases} \$103.12\frac{1}{2}\ \text{for the cloth} \\ \quad \text{season} \end{cases}$
10. $\begin{cases} \$365.75\ \text{for the slack} \\ \quad \text{season} \\ \$12.62\ \text{ave. weekly} \\ \quad \text{wage for the year} \end{cases}$
11. $\begin{cases} \$17.00 \\ 85\text{c.} \end{cases}$
12. $\begin{cases} 60\ \text{suits} \\ 36\ \text{suits} \end{cases}$
13. $\begin{cases} \$23.88 \\ \$15.62\frac{1}{2} \end{cases}$

Page 64

1. $1.04
2. $1.56
3. $3.90
4. $\begin{cases} 8.97 + \% \\ 2{,}500 \text{ suits} \end{cases}$
5. $\begin{cases} \$4.00 \\ 94.11 + \% \end{cases}$
6. $13.40\frac{1}{8}$

Page 65

7. $88\frac{3}{4}\%$
8. $33\frac{1}{8}\%$ gain
1. 11 dresses
2. $12.15

Page 66

3. $21.55
4. $7.00
5. $2.1433
6. $47\frac{4}{7}\%$
7. $\begin{cases} 56\% \quad \text{manufacturer's} \\ \quad \text{profit} \\ 63.73 + \% \quad \text{retailer's} \\ \quad \text{profit} \end{cases}$

Page 67

1. 960 doz.
2. $9.984
3. 150 doz.
4. $\begin{cases} 18 \text{ girls} \\ \$126 \end{cases}$

5. $\begin{cases} 8 \text{ workers} \\ \$10.80 \end{cases}$
6. $9.50
7. $84.21 + \%$

Page 68

8. ——
9. ——
10. ——
11. $5\frac{1}{3}\%$

Page 69

1. $\begin{cases} 75\cancel{c}. \text{ per day} \\ \$4.50 \text{ per wk.} \end{cases}$
2. $1\frac{1}{2}$ doz.
3. $\begin{cases} \frac{1}{5}\cancel{c}. \text{ per yd.} \\ 2{,}250 \text{ yd.} \end{cases}$
4. $\begin{cases} \frac{34}{36}\cancel{c}. \text{ per hr.} \\ 9\frac{1}{3}\cancel{c}. \text{ per day} \end{cases}$
5. $7\frac{3}{11}$ doz.
6. $\begin{cases} 5\cancel{c}. \text{ per hr.} \\ 50\cancel{c}. \text{ per day} \\ \$11.80 \text{ per month} \end{cases}$

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7. $\begin{cases} 45\cancel{c}. \text{ per day} \\ \$2.70 \text{ per wk.} \end{cases}$
8. $60\cancel{c}.$ or $72\cancel{c}.$
9. $\begin{cases} 24 \text{ sprays} \\ 12\frac{1}{2}\cancel{c}. \end{cases}$
10. $\begin{cases} 62\frac{1}{2}\cancel{c}. \text{ per wk.} \\ 10\frac{5}{12}\cancel{c}. \text{ per day} \\ 18\frac{5}{8} \text{ gross} \end{cases}$

SAMPLE MOUNTING AND NOVELTY WORK

PAGE 77

1. 225 samples
2. 648 samples
3. 162 samples

PAGE 78

4. 18 samples
5. 24 samples

1. 1,152 samples
2. 390 samples
3. 1,392 samples
4. 1¼ yd.
5. 1½ yd.
6. 94$\frac{7}{10}$¢.
7. ———

PAGE 79 (ORAL)

1. 36
2. 12
3. 36
4. 100
5. 100

WRITTEN EXERCISE

1. { 35 bottoms
{ 1 in. and 3 in.
2. { 91 sides
{ 22 boxes, 3 sides over
3. 12 boxes

PAGE 80

4. ———
5. ———

6. ———
7. { 20 covers
{ $\frac{7}{10}$¢.
8. 6 covers
9. { 6 covers
{ 2 sheets
1. 3,000 samples

PAGE 81

2. $8.00
3. { 25¢.
{ 70¢.
4. 5,400 samples
5. 720 samples
6. 12 thousand
7. 5,400 samples
8. 3,000 samples
9. 7,600 samples
10. 3,960 samples
11. 100 cards
12. 4,080 samples

PAGE 82

13. 882 samples
14. 12,000 samples
15. 45 books
16. 42¢.

1. { 7,200 samples
{ $6.00
2. 320 samples
3. { 462 cards
{ 2,926 samples
4. 5½ days

5. 48 books
6. 2,000 samples
7. $\begin{cases} 12,000 \\ \$6.00 \end{cases}$
8. 216⅔ books
9. 812½ cards
10. $14.40
11. $2.25
12. 300 cards

PAGE 84

13. $21.87½
14. $\begin{cases} 40 \text{ books} \\ 251\frac{1}{7} \text{ samples} \end{cases}$
15. $\begin{cases} 18,810 \text{ samples per wk.} \\ 3,135 \text{ samples per day} \end{cases}$
16. $\begin{cases} \$1.62 \\ \$4.05 \end{cases}$
17. $\begin{cases} 86,420 \text{ samples} \\ \$54.01\frac{1}{4} \end{cases}$

PAGE 85

1. $4.80
2. ⁸⁄₁₀¢.
3. $8.00
4. $1.87½
5. $1.25
6. 3⅛¢.
7. 500
8. 1⁹⁄₁₆¢.
9. $2.50
10. $35.00
11. 48 books
12. 80¢.

PAGE 86

13. 60½ yd.
14. $4.05

1. $\begin{cases} 40 \text{ bundles} \\ \$1.25 \end{cases}$
2. $\begin{cases} \$5.00 \\ 20\% \end{cases}$
3. 22½¢.
4. $\begin{cases} 12 \text{ covers, } \frac{1}{4} \text{ yd. rem.} \\ 3¢. \end{cases}$
5. 76½¢.
6. $\begin{cases} 30¢. \\ 20\% \end{cases}$

PAGE 87

7. 20¢.
8. 47¢.
9. 368¾%
1. $\begin{cases} 15 \text{ labels} \\ 4¢. \\ 16\frac{2}{3}\% \end{cases}$

PAGE 88

2. $\begin{cases} \$4.20 \\ 150\% \end{cases}$
3. $\begin{cases} 154\frac{6}{11}\% \\ 4\frac{6}{11}\% \end{cases}$
4. $\begin{cases} \$7.50 \\ 40\% \text{ gain} \end{cases}$
5. 50⅔% gain

PAGE 89

1. $\begin{cases} \frac{1}{5}¢. \\ 20¢. \end{cases}$

2. $\begin{cases} \tfrac{1}{2}\cancel{c}. \\ 50\cancel{c}. \end{cases}$

3. $\begin{cases} \tfrac{1}{2}\cancel{c}. \\ 20\cancel{c}. \\ 30\cancel{c}. \text{ less} \end{cases}$

4. \$1.12½

5. $\begin{cases} 42\cancel{c}. \\ 56\cancel{c}. \end{cases}$

PAGE 90

6. $\begin{cases} 6\cancel{c}. \\ 40\cancel{c}. \\ 50\cancel{c}. \end{cases}$

7. $\begin{cases} 7\tfrac{1}{2} \text{ yd.} \\ \$1.87\tfrac{1}{2} \end{cases}$

8. $\begin{cases} \tfrac{3}{4}\cancel{c}. \\ 1\tfrac{1}{14}\cancel{c}. \end{cases}$

9. $\begin{cases} 24 \text{ pads} \\ 2\tfrac{1}{12}\cancel{c}. \end{cases}$

10. $\begin{cases} 100 \text{ pieces} \\ 105 \text{ pieces} \end{cases}$

11. 50 or 52

12. $\begin{cases} \$1.98 \\ 278.78 + \% \end{cases}$

LAMP SHADES

PAGE 93

1. 18 strips
2. 7 in.
3. 4⅞ yd.
4. ¾ yd.
5. $\begin{cases} 30 \text{ yd.} \\ 4\tfrac{1}{2} \text{ yd.} \end{cases}$

6. $\begin{cases} 7 \text{ widths} \\ 2\tfrac{1}{3} \text{ yd.} \end{cases}$

PAGE 94

7. 1 yd., 4¾ in.
8. ———
9. 42.07 + %
10. 64.70 + %

INCOMES

PAGE 95

1. \$31.20
2. 130.70 + %
3. $\begin{cases} \$22.50 \\ 9\tfrac{3}{8}\cancel{c}. \text{ per hr.} \end{cases}$
4. ———
5. $\begin{cases} 4\tfrac{1}{2} \text{ hrs.} \\ 56\tfrac{1}{4}\cancel{c}. \end{cases}$
6. $\begin{cases} 350 \text{ hr.} \\ \$35.00 \end{cases}$

PAGE 96

7. \$6.45
8. 11½%
9. $\begin{cases} \$3.00 \\ \$2.00 \end{cases}$
10. $\begin{cases} 2,880 \text{ buttonholes} \\ \$1.68 \text{ per day} \\ 40 \text{ wk.} \end{cases}$
11. 15 hundred
12. $\begin{cases} \$7.40 \\ 4,750 \text{ yd.} \end{cases}$

13. $\begin{cases} \$920 \text{ the better position} \\ \$540 \end{cases}$

PAGE 97

14. $\begin{cases} \$250 \\ \$224 \end{cases}$

15. $7.20

16. $166\frac{2}{3}\%$

17. $\begin{cases} \$8.40 \text{ per wk.} \\ 36 \text{ wk.} \\ \$25.20 \text{ per mo.} \end{cases}$

18. $\begin{cases} \overline{} \\ 30 \text{ days} \end{cases}$

19. $\begin{cases} \$45.00 \\ 8\frac{1}{3}\% \end{cases}$

20. ———

PAGE 98

21. $\begin{cases} \$94.50 \\ 27.87 + \% \end{cases}$

22. $\begin{cases} \$137.50 \text{ to family} \\ 75.00 \text{ for clothing, etc.} \end{cases}$

WAGE RECORDS OF TRADE SCHOOL GRADUATES

PAGE 99

1. $8.00 last wage

2. $\begin{cases} \text{1st "raise" } 25\% \\ \text{2d "raise" } 50\% \end{cases}$

3. $\begin{cases} \text{3d "raise" } 87\frac{1}{2}\% \\ \$4.71 + \text{ in 1904} \\ \$10.36 + \text{ in 1906} \end{cases}$

4. $\begin{cases} 1 \text{ yr. 6 mo. at trade} \\ 228\% \text{ increase} \end{cases}$

PAGE 100

5. $15.00 last wage

6. $15.00 last wage

7. 124% increase

8. 80¢. better

PAGE 101

9. $10.09 per wk.

10. $13.50 per wk.

11. $66\frac{2}{3}\%$ increase

12. 185% increase

WOMEN'S TRADES IN PITTSBURG

1. $\begin{cases} 125 \text{ skilled} \\ 15,526 \text{ unskilled} \end{cases}$

2. $\begin{cases} 227 \text{ earn less than } \$6.00 \\ 179 \text{ earn more than} \\ \quad \$8.00 \end{cases}$

PAGE 102

3. $248 for the season

4. $30 maximum

5. $\begin{cases} 46\% \text{ saved on wages} \\ 50\% \text{ lost on output} \end{cases}$

6. $468 more

THE COTTON CROP

1. 12,000,000 bales
2. 66.3%
3. .775%
4. 32,285,714⅞ acres

5. { 3,433,500, Miss.
    { 4,578,000, Ga.
6. { ¼ bale per acre
    { .222 or more than ⅕
7. 46,821,000 lb. more for Egypt
1. 6 bales
2. $14.40

3. $10.20 saved
4. $239.40 cleared
5. $31.75 profit
6. $91.60 profit per acre
7. $4,200 more
8. 34%+ owned by whites

9. 7.6% owned by blacks
10. 93¢. per lb.
11. 217⅛ lb.
12. 5 days
13. $16.90
14. 6 wk.
15. 48¢.

GINNING

1. 6 yr., 310 days
2. 35⅘ cu. ft.
3. 15 cu. ft.
4. { 475 lb.
    { $3.00 loss

5. $716.50
6. 24¢. per bu.
7. 700,000,000 lb.
8. 96,605,600 gal.

COTTON MILLS

1. $189,799.07
2. $1,599 in 1890
3. { 185% increase
    { 23 1/13% decrease
4. 31¼ wk.
5. 1,368 workers

6. $206.64+ per yr.
7. { In Mass.
    { 77.8% higher
8. { $303.99+
    { 40.3%
9. 40,049 children
10. 30.8%

COTTON IMPORTS AND EXPORTS

PAGE 117

1. $10,000,000
2. { 228,793 bales
   { 73.4% from Egypt
3. 58⅛%

4. 25,341.66 bales
5. 8,447,220 lb.

PAGE 118

6. 66.1%

WOOL GROWING

1. 6⅔%
2. 298,715,130 lb.

PAGE 119

3. 60¢. per lb.
4. 10.3%
5. 19,416,600 lb.
6. { 33,636,982.5 lb.
   { $7,400,136.15

7. 37$\frac{1}{17}$ fleeces
1. 20¼ sq. ft.
2. $3.28⅛
3. { 1,250 goats needed
   { ⅔ of an acre

PAGE 120

4. $90
5. $77.40 real value
6. 2,196,465 lb.

WOOL MANUFACTURE

PAGE 121

1. (Subtract from present year)
2. 42%
3. 111½ days
4. 45% loss
5. 55% loss

6. { $261,360,000 expense
   { $35,640,000 profit
7. 48.1% wool

PAGE 122

8. 5.4230 grams
9. $13,800 saved
10. { $46.00 by car lot
    { 50.35 other way

IMPORTS AND EXPORTS OF WOOL

PAGE 123

1. 286,450,610.5 lb.
2. 407,573+ bales

3. 197,151,453.8 lb.
4. 262,913,705 lb.
5. 90.1% ad valorem
6. 49.1% ad valorem

SILK CULTURE

PAGE 124

1. 4,550 yr. ago (In 1910)
2. (Subtract from present year)
3. (Subtract from present year)
4. 65⅝ ounces

PAGE 125

5. 1¼ inches

6. 112,000 cocoons
7. 1,400 cocoons
8. 2,000 cocoons
9. 12 of 8-ply threads
10. $\begin{cases} 1 \text{ lb. per day} \\ 1\tfrac{1}{3} \text{ oz. per hour} \end{cases}$
11. $\begin{cases} 158.4 \text{ days} \\ 39.6 \text{ days} \end{cases}$

SILK MANUFACTURE

PAGE 126

1. (Subtract from present year)
2. 2,430.57 lb.
3. 2,161 lb.
4. $156 gain of warper
5. 3 lb.
6. $\begin{cases} 4.8 \text{ oz. raw silk} \\ 11.2 \text{ oz. weighting} \end{cases}$

7. $7.00

PAGE 127

8. 64,800 spools
9. 19.7% in N. Y.
10. 4.8%
11. $27,500,000
12. $20.3%

SILK IMPORTATION

PAGE 128

1. $\begin{cases} 11,793,155 \text{ lb.} \\ 52.5\% \end{cases}$
2. $3.30+ per lb.
3. $3.45+ per lb.
4. 77.5%
5. 36.5%

PAGE 129

6. 18¾ fold
7. $\begin{cases} \$21,066,666 \text{ in } 1870 \\ \$26,666,666 \text{ in } 1909 \end{cases}$
8. $\begin{cases} \$7\frac{1}{2} \\ \$60 \end{cases}$

FLAX

PAGE 130

1. $\begin{cases} 2\frac{1}{8} \text{ bu.} \\ 7\frac{7}{8} \text{ bu.} \end{cases}$
2. $40.03
3. 2¾ acres
4. 17¹⁴⁄₁₇ acres
5. 15,520,986 bu. in 1902
6. 7.91 bu. per acre

PAGE 131

7. 38,802,465 gal.
8. 68,212,200 gal.

9. 511,591.5 tons
10. 4.7%
11. $64.00 loss
12. 25.2¢. per lb.
13. 3.3¢. per lb.

PAGE 132

14. $137,468.80 duty
15. $1.45+
16. $\begin{cases} 200\% \\ 103\% \end{cases}$

ARE TRADE SCHOOLS NEEDED?

PAGE 133

1. 4,350 trade schools
2. $1,200,000
3. $\begin{cases} 55,123 \text{ to high schools} \\ 440,988 \text{ to trade schools} \end{cases}$

PAGE 134

4. $\begin{cases} 653 \text{ to high schools} \\ 5,228 \text{ to trade schools} \end{cases}$
5. 1,378 without a trade
6. 140 needed arithmetic
7. 260 trade schools

OUR PUBLIC SCHOOLS

PAGE 134	PAGE 135

PAGE 134

1. $21.76+per pupil
2. { 17¾% enter high schools
   80.2% fail to graduate

PAGE 135

3. $49.44+ per pupil
4. 730,232 pupils
5. 502 elementary schools
6. 3.7% decrease
7. In 1638

CHILDREN WHO ARE BREADWINNERS

PAGE 136

1. 2.7%
2. 91,970 boys and girls
3. One in every hundred
4. 822 children

PAGE 137

1. 99,249 breadwinners
2. 60,332 boys
3. 132,692 illiterate
4. 89.3%
5. 29.3%
6. 31,082 not working

PEOPLE WHO CANNOT READ OR WRITE

PAGE 138

1. 107 in every thousand
2. 8,132,000 illiterates
3. { N. Y., 4.3%
     Penn., 4.7%
     Ill., 3.2%
     Ohio, 3.1%
4. { N. Y., 1.4%
     Penn., 2.1%

PAGE 139

5. 63,600 native-born
6. 18,154 born of foreign parents
7. 9.9% in New Jersey
8. 86,648,774 illiterates

SOME MODERN INDUSTRIES

PAGE 140

1. { 15.7% women
     5.5% children

2. 5,417,347 persons
3. 277,524 children
4. 4,838,025 women

5. 485,604 girls
6. 5,323,629 girls and women

7. 29,245,177 persons
8. 1,257,542 in professions

9. 87,859 milliners
10. 344,794 dressmakers
11. 118,735 excess
12. 15,659 girls
13. 15,639 in country places

SOME EARLY INDUSTRIES

1. 3,500 years
2. $\frac{14}{151}$ or nearly $\frac{1}{8}$ of the period
3. 1,806 in England

4. Subtract from present year
5. Subtract from present year
6. $15.16
7. $\begin{cases} 200\% \text{ for spinners} \\ 275\% \text{ for weavers} \end{cases}$

FACTS ABOUT OUR COUNTRY

1. 75,693,734 in 1900
2. 1,800,000,000 world's population
3. $1,190,046 per capita
4. 29 per sq. mile
5. 25 per sq. mile, 16.6% increase

6. $\begin{cases} 27,292,803 \text{ native-born} \\ 4,150,518 \text{ foreign-born} \end{cases}$
7. 13.7% foreign-born
8. *a.* Subtract from present year
   b. Subtract from present year
9. 18,650,000 possible voters
10. 25.1% failed to vote

FACTS ABOUT OUR CITIES

1. $\begin{cases} 2,166,055 \text{ for Chicago} \\ 1,491,076 \text{ for Phila.} \end{cases}$
2. 14.1% of N. Y.'s

3. 150 per acre
4. 17 per acre

5. { 83,791 homes owned
   { 11.9% homes owned
6. 25+% in Chicago
7. { 22,838 homes
   { 12,789 rented
8. 55,363 homes owned
9. 42,000 men tailors

PAGE 147

10. 5,000 milliners
11. 116 to 1
12. 15,000 cigar-makers
13. $5,150 per worker
14. $5,370 per worker

OUR IMMIGRANTS

1. 13.2%

PAGE 148

2. 857,330 in 1903
3. 1,271,360 remained

4. 190,842 in N. Y. City
5. 25.3% from Italy
6. 25.4% illiterate